COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER AND R. DAWSON HALL, *Editors.*

Volume 20 NEW YORK, THURSDAY, JULY 14, 1921 Number 2

Though Legislation Is Shelved, Causes Remain

BECAUSE when driven to the wall in a losing fight on his coal bills Senator Frelinghuysen used intemperate language in his denunciation of the associations in the coal trade it must not be concluded that he wears horns and seeks only destruction. His record since he began the first hearing on the high prices of coal early in 1919 shows that of all those who have interested themselves in the subject he is the most reasonable, moderate and considerate of the interests of the industry. Hostile at first, believing that quite possibly the coal men had formed a combination to fix prices, he patiently inquired into the facts and gave everyone an opportunity to tell his story. He came to be recognized as the friend of the coal industry in Congress, as one who had become sufficiently familiar with the facts about coal to understand the problems of the producer, distributor and retailer and as one who would help them out of trouble. When the Senate Committee on Reconstruction ducked behind coal last summer the hope was expressed that Senator Frelinghuysen would come to the rescue, and when the Calder bill was referred to the La Follette committee instead of, as expected, to that of Frelinghuysen, regret was general. Defeat of the Calder bill by default at the close of the last session gave rise to the expressed hope that in this session Senator Frelinghuysen would assume the initiative in coal legislation and that nothing radical, therefore, would come before the Senate.

The scandal in coal prices of 1920 was no dream; it was real. All through the summer the coal industry was working to avoid the reinstatement of Federal control of prices and last October the operators were told in Cleveland by the president of their association that the danger was then still imminent and that when Congress assembled the coal question would be in the forefront. At any time during the period of consideration of the Calder bill the coal men would have welcomed a chance to back the much milder measure of the Senator from New Jersey. It has been stated on competent authority that it was by the narrowest of margins that the Calder bill was prevented from coming to a vote in the closing days of the last session and that had it reached that point it might have passed. We recite these facts only to illustrate the truth of the declarations of many that just as surely as the sun rises another flare-up in coal prices will bring on another attempt to introduce Federal regulation—an attempt that because of the history of the past year will have even greater chances of adoption. If, however, the unexpected happens and coal prices become unduly prominent this year the industry will have to turn elsewhere than to New Jersey for a champion in the Senate.

We can but give the Senator credit for having, in his own words, sought to find legislation "that would not unduly embarass the coal trade and at the same time would protect the interests of the government and of the great body of consumers." But because his intentions are of the best is no reason for concluding that his solution is of the best. He sought to find a middle ground that would not provide regulation yet that would make coal cheaper to the consumer. He did not succeed because, in the words of Senator Stanley, "the Coal Industry Stabilization Act is not a bill to regulate the coal business; it is a bill to irritate the coal business. It is a forerunner of government regulation." According to the *New York Times* "The Frelinghuysen bill was rejected because it regulated a private industry as though it were public, and because it regulated sellers without assuming control over buyers." Regulation by any other name is still regulation, and it is on this rock that the stabilization act is stranded. Willingness to co-operate with the government in fostering better conditions in the coal trade did not mean willingness to accept even the mildest form of regulation, and as soon as the possibilities along this line in pending bills were scented by the coal men who have gone on record in favor of some provision for more publicity to the facts about coal, the bill was opposed.

Because the future may hold threats of more serious portent is plainly no argument for accepting in advance even a small dose of regulation. The Frelinghuysen bill with every suggestion of compulsion and regulation left out would have been fully as effective in promoting collection and promulgation of facts about coal, and with these provisions in, it would be absolutely ineffective in preventing high prices. Despite all that has been said in the past month we are convinced that the substantial element in the coal trade believes in stable rather than speculative business and in the value of educating the consumer as a means of reaching that goal. We agree wholly with Senator Frelinghuysen that "the fundamental economic laws, such as those of supply and demand," cannot "be successfully abrogated by statute." It is for this reason that we opposed his stabilization bill.

We are convinced that the function of government in our "coal problem" should be only that of agent in assembling and interpreting in an impartial manner the facts. We should not expect the government to become the apologist for the coal or any other industry. The misconceptions of the consumer about coal should be corrected by the industry through direct appeal to public opinion. In building such an effort there is nothing so potent as data for which the government stands sponsor by reason of having collected and disseminated it. We would not have the government, however, reading conclusions into these facts, either for or against the interest of the consumer or the producer. Good will is a valuable asset but it is one that is not yet vouchsafed to coal and cannot be had without conscious costly effort.

The same energy that was expended in advocating

and opposing coal bills in the past eight months, if directed toward obtaining appropriations for extension of statistical work on coal by already existing Federal agencies under statutes now on the books, would have put us well along the way on the task of improving the public relations of coal, a task at best that will require years to accomplish.

Stabilization at a High Price

LET the railroads stabilize the bituminous coal industry, is the scheme proposed by Edwin Ludlow before the Committee on Interstate Commerce of the Senate in the hearing on the railroad situation. The plan is to have all coal-consuming roads grouped under four super-purchasing agents who would so select the coals to be used and direct the purchase, storage and consumption that great economies would result. Among the advantages expected are the allocation to each road and division of a road of a uniform grade of coal, the avoidance of cross hauls and unnecessarily long hauls, placing the purchase on a scientific basis with inspectors to see that the operators furnish what is on contract, promotion of close co-operation between the producer of the coal and the railroad, stabilization of the soft-coal industry by reason of taking greater portions of the year's requirements in the summer months, when others do not want the coal, and finally the great advantage to the public of having the railroads the only forehanded purchasers and storers of coal and thus clearing the rails in the winter for the coal needed by all the other consumers.

The scheme sounds so good that we wonder if it can be true that the solution of all our coal troubles is so easily achieved. In looking over the plan we perceive that there are really two factors in the fueling of the railroads, or any other consumer for that matter. One, and the first, is the selection of the coal best suited to the needs of the user, arrived at, of course, in a scientific manner by the mechanical engineers through boiler tests and calculations involving pounds of water evaporated per pound of coal used and the relative cost. There is nothing to prevent the fuel department of each and every railroad making these determinations on its own account. Many now do it without the overseeing eye of a super-purchasing agent. Mechanical departments know what coal they prefer, and although their choice may at times be predicated on fancy rather than on facts, more often there is reason back of their preference. Choosing the best coal is a matter of engineering plus road experience.

The other factor is buying the coal and getting deliveries of what has been purchased. It is here that policy enters so largely. On the best managed road it is often the policy of the purchasing department with respect to price and form of contract that predetermines the coal supplied the mechanical department. The purchaser of coal for railroad fuel is first of all interested in keeping down costs. If he can see lower costs and perhaps better coal by co-operating with the coal industry in a stabilization program, he will join—otherwise not. Nor can we blame him if, the rules permitting, he solves his problems by going to the other extreme with assigned cars. Purchasing agents for the railroads are quite generally in position to take full advantage of the size of their orders when in the market, and it is nothing new for them to demand lower price of the operator as compensation for better running time afforded the mines. It is useless to advocate a plan that calls on the coal consumer to help the producing industry, unless he gets *quid pro quo*.

Mr. Ludlow's plan contemplates no advantages to the railroads that are not already within reach. We cannot perceive why grouping one-fourth of the roads under one head would increase the urge to use uniform grades of coal, eliminate cross hauls, promote co-operation or seek any of the other advantages claimed. Mr. Ludlow has assembled a splendid line of arguments for stabilization of the coal industry, long-time coal contracts, storage, "co-ordination and co-operation," but he has in no wise shown us why these ideas will be helped along by concentrating the purchase of railroad coal in four men rather than in some 200 as now.

Centralization of railroad coal purchases under the Railroad Administration was an unhappy experience for coal producers until the assigned car was abolished. It would be a sad day for the coal industry that again saw such centralization of buying power, even though it be in four men instead of one. Such indeed would be a high price to pay for stabilization.

Flushing by Water or by Air?

SO FAR coal mines when flushed have used water as the transporting medium, and not air. This involves expense for the damming of the flushed material, for draining off the water and for pumping out the sumps into which the water flows. As four times as much water must be used as broken rock the pumping problem is considerable.

The use of air would save building batteries of any strength and it might well be possible to dispense with them altogether. The deposits made would not have to be drained, and the air would find its own way out of the mine. The spread of the dust through the workings also would serve to immunize them against explosions and the gob possibly against mine fires. The filling used in bituminous mines should either be placed when the mine or the part being filled is idle or should be of non-siliceous material that would do no harm to the men who are exposed to it.

In longwall retreating work pneumatic stowage would be of great assistance, as it would distribute the material and need no barrier to hold it in place, though if the coal were broken down in quantity it might so sprinkle it with dust as to render it less salable. To meet this the filling could be done when the mine was not working or when so little loose coal was lying exposed as to make the dust unobjectionable.

Air will carry extremely heavy objects through pipes. In the experiments of the United States Coal and Coke Co. at Gary, W. Va., into the possibility of removing coal from the mine by a pneumatic system it was found that not only coal but monkey wrenches and railroad spikes would travel readily by the pneumatic route.

For some time the Champion Copper Co., in the Michigan copper region, back-filled extensively with waste from the concentrator, using air as the propulsive medium. The object of the back filling was to raise the working surface of the stopes so as to make it possible for the workmen to reach the ore above. The practice was quite successful, but when the Interstate Commerce Commission decided that the transport of waste material should be charged at a higher rate the cost at the shaft became too high and the company was obliged, much against its will, to change its plans.

Elements of Design for Foundation Bolts of Machines*—I

Little Data Published Concerning the Design of Machinery Foundations and the Holding-Down Bolts Necessary—This and a Succeeding Article Summarize Available Information on This Subject

By Terrell Croft
St. Louis, Mo.

ANCHOR bolts in machine foundations perform two functions: They hold the machine down firmly on the foundation or mass of masonry on which it rests or by which it is supported and they prevent the machine from sliding laterally. It is apparent, then, that every anchor bolt is, theoretically at least, subjected to a tensile stress due to its clamping action upon the machine and also to a shearing stress originated by the tendency, if any is present, of the machine to slide sidewise or endwise along the top of the foundation. When a foundation is properly installed, however, the anchor bolt does not assume any considerable shearing stress, for the reason that if the machine bed plate is grouted to its foundation, the grout bears all lateral stresses.

The real duty of anchor bolts is, then, to bind the machine, to which the bolts are applied, firmly to the foundation upon which it rests, so that the machine and its support will for all practical purposes form a single mass. Where bolts are properly designed and placed, the machine cannot move from its position on the foundation unless this also moves or unless something breaks or fails.

Many types of anchor bolts are in use. In Fig. 1 A, B and C show ordinary machine bolts adapted to this purpose, and D, E, F and G threaded rods and deformed bolts. Each type of bolt depicted in Fig. 1 will be treated hereinafter in detail, as will certain other relatively unimportant types, by which is meant those which, though not ordinarily used, are nevertheless highly desirable for certain specific applications or where special results are desired.

Who Should Supply the Anchor Bolts?

Who shall furnish the anchor bolts for a given machine or prime mover, is a question that admits of no general answer. If the machine is an old one, these bolts must be furnished by the owner. Where it is purchased new, the anchor bolts may be furnished by either the buyer, seller or manufacturer. Machine builders usually try to persuade the purchaser to furnish his own foundation bolts. Where the manufacturer supplies them, particularly if the machine or prime mover is an expensive one, the bolts usually are included without extra cost.

There are several good reasons, however, why it is desirable for the purchaser to furnish his own anchor bolts. The first is that they can in nearly all cases be obtained locally and with little delay, whereas if they come from the manufacturer, even though they may be shipped well in advance of the machine, they are seldom delivered promptly. Furthermore, the length of an anchor bolt for a given application is determined to a large extent by local conditions. Hence such bolts for a certain machine will vary in length, depending upon the location in which the machine is to be installed. It is for this reason that no machine manufacturer endeavors to keep in stock a line of anchor bolts.

Immediately upon receipt of an order for a machine the manufacturer usually is able to furnish a drawing showing the foundation bolts necessary, as well as their locations. Upon receipt of this drawing the buyer can, without delay, obtain these bolts locally and build the foundation.

Dimensions of the necessary anchor bolts are always obtained from the manufacturer when a new machine is being purchased. The builder will always specify the diameters of the bolts required and usually their approximate lengths.

Correct Clearance Allowable for Anchor Bolts

Some clearance should always be left between a bolt and the hole for its accommodation in a bedplate, because if such clearance is not provided it may be impossible to get the bolts which are built into a foundation through the holes. Such difficulties may arise from the bolts being slightly bent or from small inaccuracies in measurement in the placing of the holes in the bedplate or of the bolts in the foundation.

Even if the clearance between the bolt and the side of the hole in which it rests is appreciable, no harm, as a rule, is done. Every machine should, generally speaking, be grouted onto its foundation. This grout prevents lateral movement, even if no bolts are used.

The clearance desirable between an anchor bolt and the hole for its accommodation in a machine bedplate cannot be determined by any set rules. A good practice where such holes are machined is to allow $\frac{1}{8}$ in. diametral clearance for bolts up to $\frac{7}{8}$ in. in diameter, $\frac{1}{4}$ in. for bolts from 1 in. to $2\frac{1}{2}$ in. in diameter, and $\frac{3}{8}$ in. for bolts $2\frac{3}{4}$ in. in diameter and larger. Where the holes for the bolts are cored in the bedplate, clearances $\frac{1}{16}$ in. to $\frac{1}{8}$ in. greater than those just specified should be adopted.

The tensile strength that an anchor bolt should possess is a quantity incapable of determination by mathematical analysis. Inasmuch as such bolts are ordinarily subjected to tensile stresses only, shearing stresses being eliminated by the use of grout, as indicated above, the diameter of an anchor bolt, as determined from a machine manufacturer's standpoint, must be sufficiently great to safely sustain such tensile stresses as may be imposed upon it. But, as suggested above, it is difficult, if not impossible, to determine even with approximate accuracy what these stresses will be.

The total stress on any bolt is made up of two chief components. It includes the initial stress arising from screwing down the nut on the bedplates, plus the stress that may be imposed if the machine tends to lift off its foundation. In practice, anchor-bolt diameters are proportioned in accordance with "rule-of-thumb" methods based on the experience of the designer.

When a designer is "working in the dark," as he is in most cases, he must provide that the diameter of the

*Copyrighted. All rights reserved by the author.

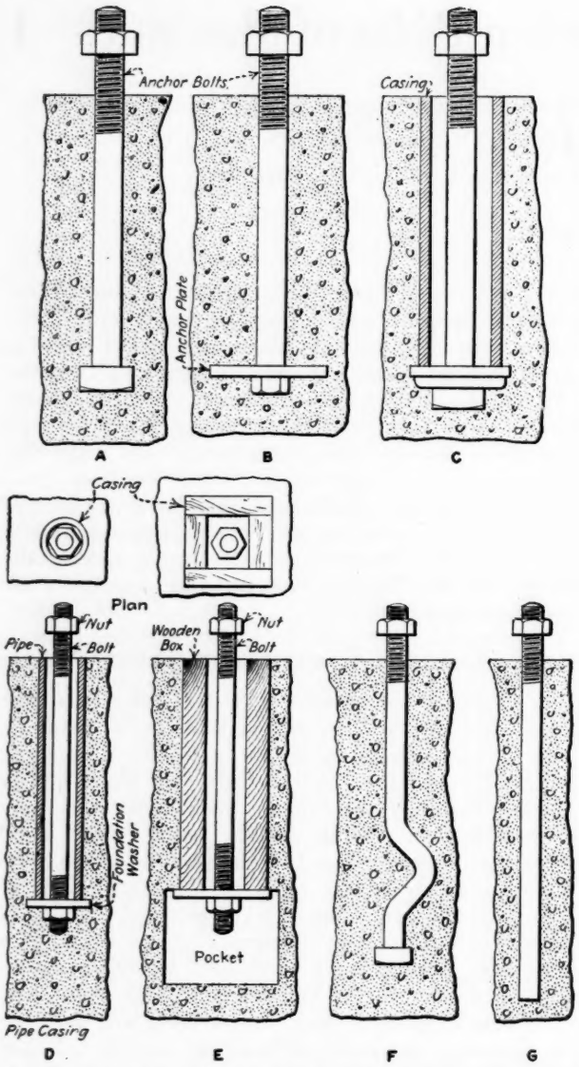


FIG. 1. SEVEN TYPES OF FOUNDATION ANCHOR BOLTS

A, ordinary machine bolt, preferable for light work; *B*, machine bolt with anchor plate; *C*, same type of bolt with anchor plate and wood casing, so arranged that the bolt will have play in case slight errors are made in foundation-bolt setting or bedplate coring; *D*, rod bolt with nut and washer at lower end and a pipe casing; *E*, same but with wood casing and a pocket which may be open or closed; *F*, distorted machine bolt; *G*, straight-rod bolt without a head on the end.

bolt he specifies for a given condition be ample. For this reason the diameters of the anchor bolts in foundations probably are in many cases excessively large.

For general work the minimum diameter of any anchor bolt should be ⅝ in. An able-bodied man with an ordinary monkey wrench can twist asunder a bolt of a diameter smaller than ⅝ in. Hence this size is used in many cases where the conditions are such that a smaller bolt might safely sustain the tensile stresses imposed by the machine itself.

The tension that safely may be placed upon ordinary wrought iron or mild steel such as that used for foundation bolts, is about 7,000 lb. per square inch. Sometimes material possessing a safe tensile strength of only 6,000 lb. per square inch is used. These values give a factor of safety somewhere around 8 to 12, the exact factor being determined in any case by the composition of the metal. In figuring the tensile strength of an anchor bolt it is, of course, necessary to consider the effective diameter as that existing at the root of the threaded portion.

In determining the diameter of a foundation bolt, the manufacturer must consider the stress that the bolt probably will have to support, and then, using his judgment as a guide and the diameters of anchor bolts in successful existing installations as precedents, select a size that assuredly will be safe.

When the user determines the diameters of the foundation bolts for a machine where the sizes required have not been specified by the manufacturer it is only necessary for him to measure the diameter of the hole in the bedplate and then select a bolt of such diameter that the clearance between it and the hole will be about that named in one of the paragraphs preceding.

Bolt Must Break Rather Than Pull Out

The proper length for an anchor bolt usually depends upon only one factor. This is that the bolt should extend down far enough into the foundation so that it will break rather than pull out. Where a bolt is cast solidly into a foundation, as shown in Fig. 1 at *A* and *B*, enough masonry must be provided above its head in case *A* or above the anchor plate in *B* to prevent the bolt being pulled out. If the masonry does not set compactly around the shaft in either of these instances, any tension imposed on the upper threaded end will be transferred to the bolt and to the anchor plate. This will exert a shearing action on the foundation material.

Enough masonry must, therefore, exist between the top of the foundation and the embedded head of the bolt so that neither the bolt head nor the anchor plate can shear out the masonry above and thus permit failure in case the bolt is stressed excessively. If the masonry sets up to the shaft of the bolt, some adhesive action will exist between the two, which provides a certain amount of resistance to withdrawal.

Anchor bolts that are built solidly into a concrete foundation—that is, with the concrete poured and tamped directly around them—will be considered in detail later. As a rule the lengths of anchor bolts are made such that they may extend almost to the bottom of the foundation. Thus there will be every assurance that the mass of masonry above the heads of the bolts will be ample to prevent their withdrawal. One "practical" rule for the average masonry foundation is that an anchor bolt should be embedded at least 40 diameters.

Where short bolts are used in a foundation which is green or otherwise weak, there is a tendency to crack off an upper stratum. This is eliminated where the bolts are carried almost to the bottom of the foundation.

In Concrete Must Be Thirty Diameters Long

When an anchor bolt is cast solidly into a concrete foundation, the adhesion of the concrete will equal the tensile strength of the bolt if its submergence in the concrete equals twenty-five times its diameter. However to provide a margin of safety such bolts should be set in at least thirty diameters. This matter will be discussed in detail later.

Anchor bolts placed in casings should be long enough to permit of deflection. Where a bolt is thus installed as shown at *C*, *D* and *E*, Fig. 1, its length should be such that its top can be deflected a trifle in any direction. One function of the casing is to admit of a slight shifting of the top of the bolt, so that it can be inserted into its hole in the machine bedplate even if either it or the bedplate hole has been mislocated slightly. Unless the bolt is long enough so that it can be sprung or deflected, the function of the casing will be defeated.

In determining the over-all length of an anchor bolt for a given installation, such as that shown in Fig. 2, several inches must be added to the nominal buried length, *P*. At the upper end the additional length are: A clearance of at least ¼ in. above the nut, the thickness of one nut, or even of two, if locknuts are employed, the thickness of the machine bedplate or foot through which the bolt passes, and at least 1 in. should be allowed for grout. At the lower end of the bolt the following must be provided for: The thickness of the anchor plate, the thickness of the nut, and a ½-in. extended end. These quantities added together will give the total or over-all length of the rod required for making the anchor bolt.

All anchor bolts may be divided into two general classes, removable and non-removable, in accordance with the method used for their installations. Non-removable bolts, such as those shown at *A*, *B*, *C*, *D*, *F*, and *G* in Fig. 1, cannot be taken from the foundation after they are once installed. Removable bolts, like those shown at *E*, Fig. 1, and that depicted in Fig. 3, can be removed from their foundations at any time.

Advantage of Making Anchor Bolts Removable

Removable bolts are desirable, particularly in large installations, for two reasons. The first is that where the bolts are removable, if one cracks or breaks—an infrequent, but occasional, occurrence—a new one can be readily inserted. The other reason is that a machine can be installed much more rapidly and at less expense where the bolts are removable. If the bolts are non-removable it is necessary in skidding the machine bedplate into position to jack it up over the threaded bolt ends protruding from the foundation, and when the bedplate is in its correct lateral position to lower it over the bolts. The extending bolt ends always make much extra work by interfering with the skids and, furthermore, they are frequently bent or their threads battered while the machine bedplate is being installed. Where the bolts are removable the bedplate is brought to its correct position on the foundation, and after being put in place the bolts are dropped down through the holes in the bedplate, through their casings and into the nut which is supported in the anchor plate below.

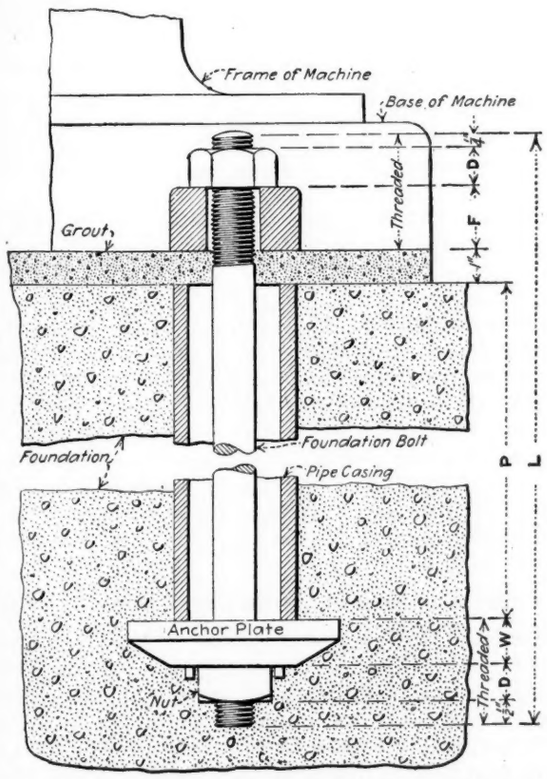


FIG. 2. ILLUSTRATING ALLOWANCES NEEDED IN ORDERING ANCHOR BOLTS

It must not be overlooked that there are two bolt thicknesses, *D*, *D*, the bedplate thickness; *F*, the grouting allowance of 1 in. and an aggregate length of ¾-in. for the projection of the threads above and below the top and bottom nuts, all of which must be allowed for in addition to the net length, *P*, in obtaining the gross length, *L*, of the rod from which the bolt must be constructed.

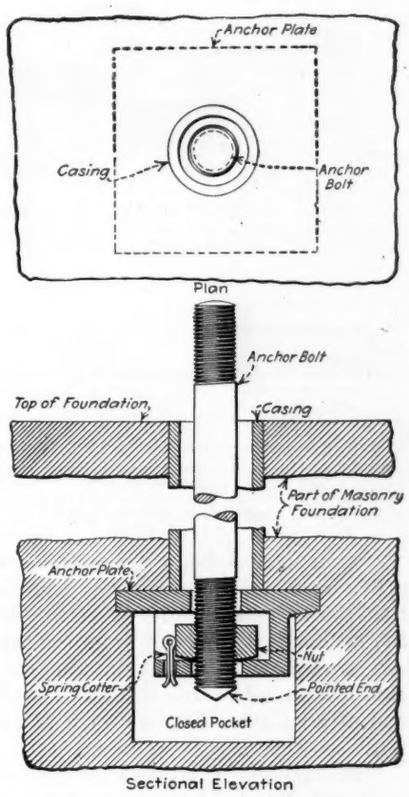


FIG. 3. POINTED ANCHOR BOLT WITH CLOSED POCKET

The height of this bolt is adjustable after the machine has been set in place. The lower end can be screwed into or out of the lower nut.

Removable bolts are almost essential for large machines because if a non-removable foundation bolt of a large machine be broken it will be extremely difficult and expensive to dig out the great mass of masonry of the foundation so as to obtain access to the lower end of the bolt. With a foundation for a small machine much less of this masonry removal would be necessary; furthermore it is much easier to raise a small machine above the projecting ends of non-removable bolts and to let it down over them than it is with a large machine.

Use of non-removable anchor bolts such as those shown in Fig. 1, at *A*, *B* and *C* usually is restricted to small and unimportant foundations. It is impossible to remove these bolts without cutting away a large portion of the foundation. They have, however, the advantages of low cost and ease of installation.

Bolts of Small Machines Should Not Break

With small machines exceedingly large bolts uusually can be employed—that is, bolts which are designed with unusual factors of safety—without materially increasing the cost of the foundation. Where the bolts are thus proportioned and there is practically no likelihood of their ever breaking, the application of "built-in" bolts is justified in the case of a small machine. It should always be remembered, however, that where the bolts are built in solid, it will be necessary when the machine bedplate is being set to jack the machine up over the ends of the bolts which extend from the top of the foundation. This may or may not be disadvantageous.

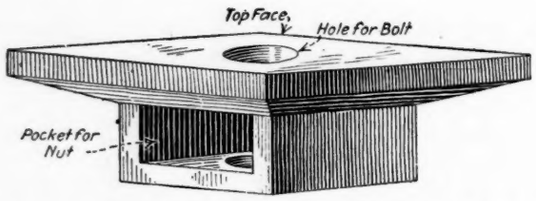


FIG. 4. ANCHOR PLATE WITH RECESS FOR NUT
With this device the level of the top of the rod can be adjusted to suit conditions after placing of machinery.

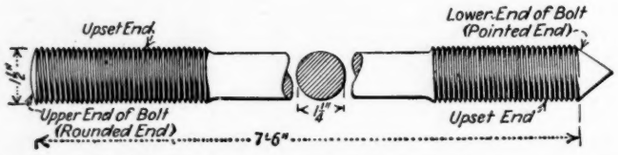


FIG. 5. ROD ENLARGED, OR "UPSET," AT THREADED ENDS
In order to make the heavier rods as light as possible those parts which have to be threaded are made of such a diameter that the base of the threads is of the same diameter as the body of the rods. Thus in a sense the thread is cut in the excess metal.

Where anchor bolts are removable, pockets must be provided under their ends as well as anchor plates, so that the lower extremity of each bolt can be inserted in the anchor plate and nut from the top of the foundation. An anchor-plate pocket in such a case is merely a cavity built into a foundation to accommodate the lower end of an anchor bolt where it is threaded through its nut.

Two classes of pockets are in general use, namely open and closed. An open pocket is one (see Fig. 1, E) that is accessible from the outside of the foundation. A closed pocket, Fig. 3, is merely a cavity under the anchor bolt and is, therefore, not accessible. The terms "accessible" and "inaccessible" are sometimes used instead of open and closed.

Open pockets are preferable to closed ones because where the pocket is open, the lower nut always is accessible and can be renewed in case its thread strips. Furthermore, the anchor plate for an open pocket can be replaced with slight effort, if it breaks. Where the pocket is closed much work may be involved in making repairs such as those just indicated. In practice, however, nuts seldom strip or anchor plates break, hence closed pockets are employed in many instances, particularly where the bolts with which they are associated are well in toward the center of the foundation and away from its edges.

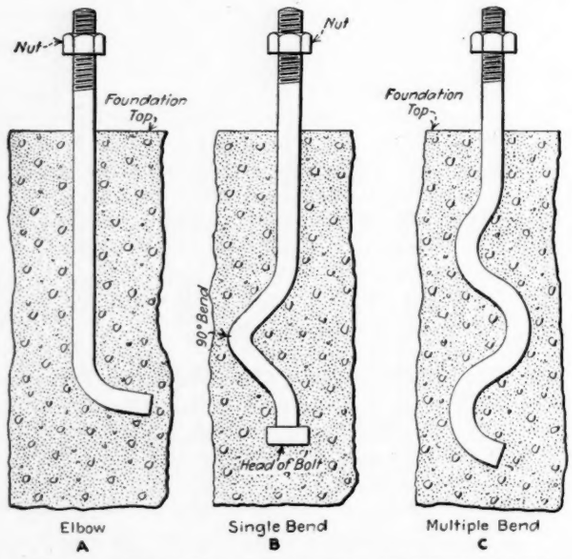


FIG. 6. DEFORMED, DISTORTED OR BENT BOLTS
The distortion should be well below the top of the foundation, for the resistance of the concrete depends on the length that has to be sheared. Any irregularity near the top of the foundation is of little value, especially if in the same plane as those below. The multiple bend bolt, *C*, is like a bolt with two "heads," one at the end and the other part way of its length. The upper bend has small holding power.

Deep-Seated Bolts Should Have Closed Pockets

To convert such closed pockets—those well removed from the sides of the foundation—into open ones would necessitate relatively long tunnels. Such tunnels sometimes are difficult to provide. Where pockets are used at the lower ends of foundation bolts a nut-pocket anchor plate, as shown in Fig. 4, should be used. Such an anchor plate is provided with a recess for the reception of the nut, by which means it is retained in position and prevented from turning.

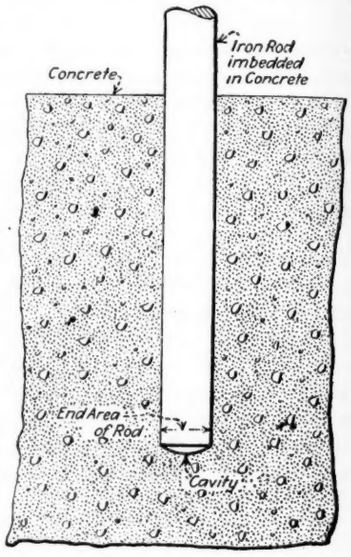


FIG. 7. END AREA INEFFECTIVE TO HOLD BOLT
Cavities form under the ends of rods when they are incorporated in concrete, and consequently only the sides of the bolts can be relied on to provide the needed adhesion.

Where pockets are provided the lower ends of the anchor bolts should be pointed as shown in Fig. 3, so that they will readily engage in the nuts held in the anchor plates. Where closed pockets are used, the nuts are placed in the plates prior to their insertion in the foundation. If the pocket is open, the insertion of both nuts and plates can be deferred until just prior to the installation of the bolts.

The nut in a recessed anchor plate does not fit tightly in its recess because accuracy is impossible with unmachined castings of this kind. Consequently such a nut is free to shift from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. in any direction within its restricted cavity. If the lower end of the anchor bolt is pointed the bolt will readily "find" the threaded hole in the nut, which is thereby shifted to a position concentric with the longitudinal center line of the bolt. If the lower end of such a bolt is not pointed some difficulty may be experienced in effecting an engagement between it and the nut as it rests in its anchor plate.

When Standard Machine Bolts May Be Used

Standard machine bolts used as anchors are shown in Fig. 1 at *A*, *B* and *C*. These bolts can be conveniently applied to the foundations of small machines because they usually can be obtained from stock at any machinery supply house or hardware store. Threads, heads and nuts of machine bolts in the United States are all proportioned in accordance with standard dimensions given in engineers' and machinists' handbooks. Where the diameter of an anchor bolt is $\frac{3}{4}$ in. or less, standard machine bolts can, in most cases, be effectually employed.

Threaded rods used as anchor bolts are shown in Fig. 1 at *D* and *E*. Most of the anchor bolts used in the United States probably are of this type. These consist merely of plain round-iron or mild-steel rods threaded at both ends. The diameter to be employed in any given installation is determined in accordance with the directions given in preceding paragraphs. The length also can be found as outlined.

Only Large Anchor Bolts Should Be Upset

The ends of anchor-bolt rods of large diameter should be upset as shown in Fig. 5, so that the cross-sectional area of the rod in its unthreaded portion will equal the diameter of the rod at the root of the threads. It is not economical to upset rods less than say 1½ in. in diameter because the cost of the upsetting operation in such cases exceeds the value of the material saved by this process. Obviously, the tensile strength of any threaded rod should be determined by the cross-sectional area at the root of the thread.

Deformed bolts sometimes are used as anchors for small machines, as shown in Fig. 1 at *F* and in Fig. 6. Bolts of this type usually are applied in concrete foundations, although sometimes they are used in those built of brick or stone laid in mortar. The bolt is deformed to prevent its turning in the masonry when the nut is being screwed on or off and to prevent the withdrawal of the anchor. It frequently occurs that the depth of a foundation is such that it does not permit the installation of a plain round bolt of such length that it will adhere to the concrete with sufficient tenacity to withstand the stress imposed. In such cases the resistance of the bolt to withdrawal may be greatly increased by deformation in accordance with one of the methods shown.

Excessive deformation of such a bolt is neither desirable nor necessary. Where a plain round rod is used an elbow can be bent upon its lower end as shown at *A*, Fig. 6. If the extending part of the elbow has a length equal to five or six bolt diameters it will be ample. Where a machine bolt is used it can be deformed as shown at *B*, Fig. 6, by bending in it a 90-deg. knee. The apex should be offset about three or four diameters.

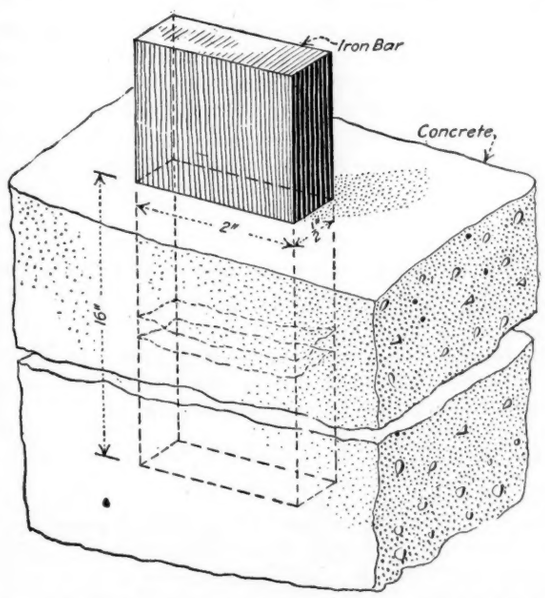


FIG. 8. ILLUSTRATING CALCULATIONS ON THE ADHESION OF IRON BAR IN CONCRETE

The adhesion may be expected to equal 250 lb. per sq.in. on all areas except the end area, but with a fair factor of safety 75 lb. is the better figure to take. No one can tell what the pull to be resisted will measure, but there is no advantage in having the adhesion greatly exceed the strength of the bolt against rupture.

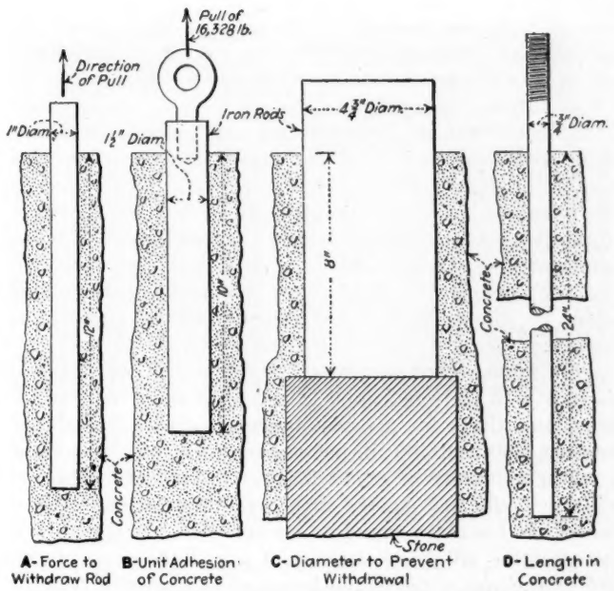


FIG. 9. SKETCHES ILLUSTRATING FOUR PROBLEMS

Illustration *C* shows how by a ridiculous allowance of only 8 in. for the depth of the bolt it becomes necessary to make it 4¾ in. in diameter to obtain the required adhesion, which, of course, is an immense waste of expensive material—rod, nuts, etc. The large hole in the bedplate also would weaken it materially. This shows why long bolts with ample washers are needed and used.

Deform Only Lower End of Anchor Bolt

Where any bolt is deformed the knee or bend should be quite close to its lower end. If such a bend is near the upper end of the bolt—that is, if it lies in the foundation near the top—there is a possibility that when a stress is imposed, the bend will straighten and break out the masonry of the foundation. It is for this reason that the bent bolt *C*, Fig. 6, is one of poor design. One bend near the bottom of the bolt probably will be ample to hold it in place. The other two bends near the top are unnecessary and may be the cause of failure.

Some construction men prefer to make a semicircular bend in a deformed bolt, as shown in Fig. 1 at *F*. The advocates of this method maintain that the forming of a 90-deg. bend (*B*, Fig. 6) in a rod is liable to greatly reduce its strength. Deformed or bent bolts are widely used in structural steel work for anchoring columns to footings.

Headless bolts—that is, those without anchor plates or nuts at their lower extremities—can be effectively used for relatively small machines where the foundations are of concrete. The adhesion of this material (as will be shown later), provided the bolt is embedded in it for a sufficient length, will be great enough to prevent withdrawal.

Headless bolts should not be used in brick or stone masonry foundations. The adhesion between the surface of the bolt and the foundation in practically every case of this kind is so small in the aggregate that it offers but little resistance to withdrawal. Even if a brick or stone foundation is laid in cement mortar, only a small portion of the embedded surface of the bolt may be in contact with the mortar itself. Practically no adhesion exists between brick or stone in such a founda-

tion and the surface of the bolt. For this reason an anchor plate should invariably be placed on the lower end of a bolt when these materials are used to construct a foundation.

Adhesion between iron or steel set in concrete varies from about 250 to 400 lb. per square inch. In practice a value of about 250 lb. per square inch is assumed as the ultimate bonding strength. In reinforced concrete work it has been authoritatively recommended that the safe adhesive strength between mild steel or iron rods and the concrete in which they are embedded may be taken as about 75 lb. per square inch of surface in contact.

This means that for every square inch of exposed surface of a rod embedded in concrete there will be an adhesion—that is, a resistance to withdrawal—of between 250 and 400 lb. per square inch, but, assuming a factor of safety of about 3.3 to 5.3, the safe adhesion will be 75 lb. per square inch, as above noted. These values are for plain round or square bars. In computing the effective adhesion surface of a rod the area of the end of the rod is neglected because, as shown in Fig. 7, there is nearly always a cavity underneath the extremity of every rod set in concrete. That part of the rod in contact with this cavity or air pocket is, of course, ineffective as regards adhesion.

The adhesion between any iron rod and the concrete in which it is embedded can be computed from the following formulae:

(1) $p = a \times A$ (pounds)

(2) $a = \frac{P}{A}$ (square inches)

(3) $A = \frac{P}{a}$ (pounds per square inch)

Wherein p = the total adhesion of the concrete to the rod in pounds, that is, the pull necessary to withdraw the iron or steel rod from the concrete a = the area of the sides of the rod in contact with the concrete, and A = the unit adhesion in pounds per square inch between the rod and the concrete, values for which are given in a preceding paragraph.

As an example: How many pounds pull would be required to withdraw from the concrete a ½ x 2-in. iron bar (shown in Fig. 8) embedded for a distance of 16 in.? *Solution*—The area of the sides of the rod in contact with the concrete is: $16 \times (2 + 0.5 + 2 + 0.5) = 16 \times 5 = 80$ sq.in. Assuming from a preceding paragraph that a unit adhesion of 250 lb. per square inch exists between concrete and iron and substituting this value in formula (1) we have: $p = a \times A = 80 \times 250 = 20{,}000$ lb.

The adhesion or resistance to withdrawal of a round iron or steel rod set in concrete is given in the following formulae: The superficial area of any cylinder = 3.1416 $d\ l$ (wherein d is the diameter and l the length or πdl), from which it follows that:

(4) $P = A\pi dl$ (pounds)

(5) $A = \frac{P}{\pi dl}$ (pounds per square inch)

(6) $d = \frac{P}{A\pi l}$ (inches)

(7) $l = \frac{P}{A\pi d}$ (inches)

In the above P = the pull in pounds necesary to withdraw—or the resistance to withdrawal exerted by—the round iron or steel rod set in concrete; A = the adhesion of concrete to steel or iron in pounds per square inch; $\pi = 3.1416$, a constant; l = the length in inches, of the portion of the rod set in the concrete and d = the diameter of the rod in inches.

Again assuming an example: How many pounds pull will be required to withdraw the round rod of Fig. 9*A* from the concrete? This rod is 1 in. in diameter and is set in the concrete for a distance of 12 in. *Solution*—Assuming 250 lb. per square inch as the adhesion of the concrete to the steel, and substituting in formula (4): $P = A\pi d\ l = 250 \times 3.14 \times 1 \times 12 = 9{,}420$ lb. Therefore a pull of about 9,500 lb. would withdraw the rod. Another example: If a pull of 16,328 lb. (Fig. 9, *B*) withdraws a round steel rod 2 in. in diameter set in concrete a distance of 10 in., what is the adhesion in pounds per square inch of the concrete to the rod? *Solution*—Substituting in formula (5):

$$A = \frac{P}{\pi dl} = \frac{16{,}328}{3.14 \times 2 \times 10} = \frac{16{,}328}{62.8} = 260 \text{ lb. per square inch.}$$

Therefore the unit adhesion of the concrete to the iron, with conditions assumed as above, is 260 lb. per square inch.

Let us take still another example: It is desired to so set a rod in concrete that it will safely withstand a pull of 5,000 lb. Conditions are such that the rod can be embedded only 8 in. What must be its diameter so that the total adhesion between it and the concrete will be sufficient to prevent the pull above assumed from withdrawing it? *Solution*—Assume a factor of safety of 6. The safe unit adhesion of the concrete to the rod then will be $250 \div 6 = 41.7$ lb. per square inch. Now substituting in formula (6):

$$d = \frac{P}{A\pi l} = \frac{5{,}000}{41.7 \times 3.14 \times 8} = \frac{5{,}000}{1{,}047.5} = 4.78 \text{ in.}$$

Hence the rod should be 4.78 in., or, say, 4¾ in. in diameter (as shown in Fig. 9, *C*) to provide sufficient adhesion surface to prevent withdrawal under the conditions assumed. This is an extreme case and one that probably would not occur in practice. It is given merely to illustrate the principle.

Let us take yet one more example: A ¾-in. diameter mild steel rod has a probable breaking strength of about 14,000 lb. How far should such a rod be set in concrete so that the adhesive strength between the concrete and the metal surface will just equal its probable breaking strength? *Solution*—Assume that the unit adhesion of concrete = 250 lb. per square inch. Substituting in formula (7) we have:

$$l = \frac{P}{A\pi d} = \frac{14{,}000}{250 \times 3.14 \times 0.75} = \frac{14{,}000}{5.887} = 24 \text{ in.}$$

Hence the ¾-in. rod should be set in the concrete for a distance of at least 24 in.

The tensile strength, or supporting power, of a round iron or mild steel rod, assuming the elastic limit of this material to be 25,000 lb. per square inch, is:

(8) $T = \frac{25{,}000\ \pi d^2}{4}$ (pounds)

(9) $T = 6{,}250\pi d^2$ (pounds)

Wherein T = the supporting power, in pounds, of a round iron or steel rod when stressed to the elastic limit, or to 25,000 lb. per square inch; $\pi = 3.1416$, a constant, and d = the diameter of the rod, in inches. Mild bolt steel has an elastic limit of about 25,000 lb. per square inch and will yield excessively if stressed beyond this amount.

The depth to which a rod should be set in concrete so that its supporting power is just equal to the adhesion

between its surface and the concrete can be computed as indicated below. For the condition just stated to be satisfied it is obvious that the adhesion of the concrete to the rod should be exactly equal to the strength of the rod, that is:

(10) $P = T$

Taking 250 lb. per square inch as the adhesion between concrete and steel

(11) $250\pi dl = 6{,}250\pi d^2$

(12) $250l = 6{,}250d$

(13) $l = 25d$

Hence it is apparent that to insure against the withdrawal of a round iron anchor bar it should be set in concrete a distance at least equal to 25 of its own diameters. Theoretically such a rod would pull out when the stress upon it became equal to 25,000 lb. per square inch of its cross-sectional area.

It should be noted, however, that in the above demonstration it was assumed that the rod was not threaded. A threaded rod is obviously weaker than an unthreaded one. Foundation bolts always are threaded. Consequently the quantity "25*d*" is theoretically a liberal one. the letter "*d*" in all of the above formulæ indicates the outside diameter of the rod, not the diameter at the root of the thread.

In practice the rule followed in setting round iron rods in concrete when it is desired that their full strengths may be developed is that the rod should be embedded at least 30 diameters. Inasmuch as the strength of the bond between a rod and the concrete in which it is embedded is a somewhat uncertain factor, plain rods in order to develop their full strength should for safety be embedded somewhat more than 25 diameters—the theoretical distance.

The value of 30 diameters, given above, is believed to be a conservative one. Where an anchor embedded in concrete has a head on its lower end—that is, where a machine bolt is used—it probably is the best practice to disregard the resistance of this head to withdrawal when a tension is imposed on the bolt. Such a bolt should be considered as being a plain rod without head.

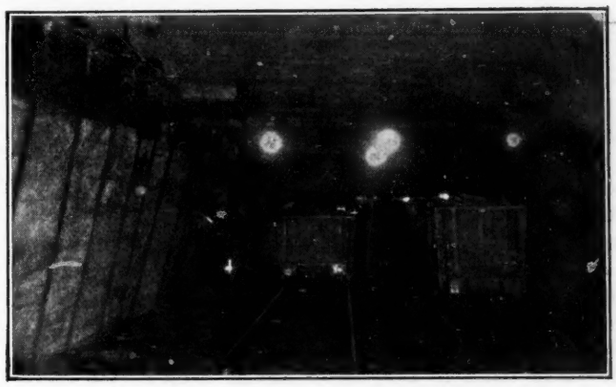
An anchor rod that has been cast into a concrete foundation a distance determined by the rules given above is shown in Fig. 1 at *G* and in Fig. 9 at *D*.

Steel Timbers Last as Long as the Mine

By D. C. Ashmead
Wilkes-Barre, Pa.

IT SOMETIMES seems strange that the use of steel mine timber, particularly at shaft bottoms, has not been more generally adopted. Seldom is the life of a shaft less than ten years, while it may vary from this up to one hundred years or even more. The use of wood, especially if untreated, in a place of this kind appears little short of folly. The average life of wooden timbers underground is not more than five years, while in many cases it does not exceed three. Of course places may be found where its life will be longer than the period named. On the other hand, under certain conditions its life may not reach one year.

To employ a material of construction of which the span of useful life is short and that will consequently require renewal several times during the life of the shaft hardly appears to be good engineering. The cost of a few replacements will exceed the expense involved in a permanent installation. After this each additional replacement represents a total loss.



SHAFT STATION AT LYTLE COLLIERY
The H-legs are 8 in. and the I-beams are 20 in. deep. They are set on 5-ft. centers.

Take as an example a shaft that has an estimated life of fifty years. If the timbers in this shaft are untreated they will require renewal from ten to twelve times before this opening is abandoned. If treated wooden timbers are employed they require renewal, say, every ten years, or five times during the life of the shaft. If steel timbers were put in place at the start it would not be necessary to replace them at all, provided, of course, that they were properly cared for and periodically painted.

The shaft station serving the sixth level in the mine of the Lytle Coal Co., a subsidiary of the Susquehanna Collieries Co., near Minersville, Pa., has been remodeled and all wooden timber dispensed with. The station proper is about 75 ft. long and contains a double track near the shaft. These tracks are then joined into one which extends for a short distance to a point where it branches into three headings.

In the main part of the station eleven three-piece sets of steel timbers have been placed. These have 8-in. H-section legs and 20-in. I-beam cap pieces 20 ft. long. Farther back or away from the shaft such heavy roof supports are unnecessary. Here 14-in. I-beam cap pieces on 8-in. H-legs are installed.

These steel sets are placed on 5-ft. centers. The spaces between the H-section legs are filled with concrete, while over the I-beams pieces of old mine rail have been placed with the space between them and the roof filled with wood lagging. It is advisable to employ wood against the roof, as this acts more or less as a cushion, taking the weight of the roof and transmitting it uniformly to the steel timbers. If wood lagging were not thus used weight might be suddenly thrown upon the timber locally, causing it to bend and perhaps fail.

Where the two tracks are merged together, much smaller I-beams may be safely used to hold the roof, these being here only 10 in. deep. The span at this point is 10 ft. and the legs of the sets are 6-in. H-sections. In one of the headings serving this shaft 9-in. I-beams supported on 6-in. H-section legs are employed. In all eleven sets of steel timber with 20-in. I-beams 20 ft. long are used, giving 10 ft. of clear headroom; five sets with 14-in. I-beams; fifty sets with 10-in. I-beams; and twenty-eight sets with 9-in. I-beams, making a total of 94 sets.

Installation of these steel timbers, if reasonable care is bestowed in their preservation, practically assures the safety of the shaft station as long as the mine remains in operation.

Time-Study Watch That Records Number of Operations Performed in One Hour

TO MEET the ever-increasing demands of various industries for time- and motion-study equipment, a new instrument has been designed termed the duration time-study watch. This is intended to handle the timing, analysis and observation of from one to ten operations, up to and including five minutes of duration.

As illustrated, this instrument has three circles on the face of the dial. The outer one is in red, the second circle is in black and the inner circle in blue. The large hand makes a complete revolution in 100 seconds, and the small hand in the center moves over a red, black and blue sector, thereby showing in which circle the large hand is indicating.

All figures on the face of the dial denote production per hour, based on the timing of ten operations. As an illustration: If ten operations were observed to have been performed in 20 seconds, the figure under the large hand in the red circle would show 1,800 operations per hour, based on ten operations having been completed in 20 seconds. If instead of ten operations one were observed to have lasted 20 seconds, in place of 1,800 it would be necessary to point off one figure with a decimal; the result thus would be 180 operations per hour, based on one operation being completed in 20 seconds.

WATCH FOR TIME STUDY

This watch determines not only the time which an operation takes but gives the number of operations per hour that can be performed at that rate.

If an operation is timed and its duration is 130 seconds it will be noted that the large hand will have made one total revolution and thirty seconds additional, while the small hand in the center of the dial will have passed the first sector and show in the second. This is black and denotes that the number of operations must be read in the black circle. Accordingly reading under the 30-second mark in the black circle the figure 277 will be noted. However, this figure being based on the observation of ten operations, and only one having been timed in that period, it is necessary to point off one figure, and the result is then 27.7 operations per hour, based on one operation timed in 130 seconds. The same applies to work requiring longer periods; as the small hand moves in the colored sector, showing in which circle the large one is operating, it is easy to calculate the elapsed time.

The instrument has the take-out time feature, which allows the operator to start and stop the watch without returning the large hand to "zero." When an operation is entirely completed, pressing the crown down returns both hands to the starting point. The dial is divided into seconds and half seconds.

The instrument is of sturdy construction, designed for industrial purposes. With present endeavors to analyze and cut costs it should prove a valuable adjunct to every plant. It is placed on the market by the Mortimer J. Silberberg Co., of 122 South Michigan Ave., Chicago, Ill.

Straight Dynamite That Will Not Freeze Even in Zero Weather

E. I. DU PONT DE NEMOURS & CO. has developed and perfected a formula for the manufacture of straight dynamite which results in that explosive being proof against freezing even in zero weather. In consequence of this development the company has determined to discontinue the manufacture of its former straight dynamite and hereafter all explosives will be made by the new low-freezing method. The perfecting of the formula is the result of years of experimentation in the laboratory and in the field. Straight dynamite has for years been the standard of the world and in nearly every kind of open work, but a disadvantage has been its liability to freeze at temperatures below 50 deg. F. As any dynamite loses some part, if not all, of its efficiency when chilled or frozen, many attempts have been made to make it low-freezing. The perfection of the new "powder" by the Du Pont company makes it possible to use straight dynamite the year round in industrial operations. Thawing, with its loss of time and attendant dangers, has practically been eliminated.

Which Equipment Should I Install—A Motor Generator or a Rotary Converter?*

BY C. A. BOOTH
St. Louis, Mo.

IT is frequently necessary to supply direct current when only alternating-current power can be obtained from the central-station mains. Either motor generators or rotary converters may be employed for changing the alternating to direct-current power. A rotary converter probably is the most desirable equipment to use for such service.

This statement might not have been true five years ago—before rotary converters were developed to their present state of perfection. The synchronous or rotary converter usually costs less and occupies less floor space than does an equivalent motor generator. However, there is a fixed relation between the alternating-current voltage delivered to a synchronous converter and the direct-current voltage delivered by it. On the other hand, with the motor generator, either the alternating or the direct-current voltage may, within reasonable limits, be varied independently of one another. By the aid of suitable equipment the direct-current voltage furnished by a synchronous converter can be increased or decreased by adjusting the alternating-current potential.

One feature of a synchronous motor-generator set that sometimes makes its installation desirable is that by overexciting the synchronous motor, the power-factor of the alternating-current system that serves it may be improved.

*Copyrighted. All rights reserved.

GAS EXPLOSION KILLS ONE AND INJURES EIGHT.—As the result of a gas explosion in the Knickerbocker mine of the Philadelphia & Reading Coal & Iron Co., near Pottsville, Pa., in the afternoon of June 22 one man was killed and at least eight injured. It was said to be the heaviest explosion ever experienced in the mines of Schuylkill County. Many miners were burned and the mine set on fire.

Results Obtained by Air Jigging and the Advantages Which the Absence of Water Affords*

Air Jig Reduces Ash and Phosphorus but Slightly Increases Sulphur, Which in Coal Tested Apparently Is Part of Coal—Refuse Tailings So High in Ash That to Outward Appearance They Are Entirely Free of Coal

By Edward O'Toole†
Gary, W. Va.

DIFFERENT types of dry-concentrating and jigging machines have been tried for the separation of ore, seeds and cereals, one of which has been adapted to coal separation during the past year. This machine gives promise of satisfactorily solving this seemingly hopeless problem. It applies the same principle to coal separation that is used for the separation of seeds, cereals, beans, nuts, etc.

On this machine air, which is more than eight hundred times lighter than water, is used as the flotation medium. The material to be separated should first be properly sized. The process effects segregation by taking advantage of the difference in the weight of the materials to be separated. When mixtures containing materials differing in specific gravity are fed to the deck of the machine each material is separated by that difference in weight, and the segregated matter is propelled across the deck surface to suitable discharge spouts.

An ordinary blower fan is built into a suitable base frame, on which is mounted a running gear carrying an air chest which receives the air delivered by the fan. A perforated deck of steel, cloth or silk forms the air chest cover and constitutes the separating mechanism of the machine. An air gate is built into the base frame for regulating the quantity of air handled and a speed-change device is incorporated into the operating mechanism to regulate the number of vibrations of the deck by which the material is propelled across its surface.

Tiny Jets Lift Coal Above Corrugations

The air from the fan is lightly compressed within the air chest, and passes through the apertures of the perforated deck in a multiplicity of tiny jets. These, on expanding, create an air film on the upper surface of the deck. The air film supports the deckload of material and causes the separation, the adjustments of the deck and its oscillations, relegating each particle to its own appropriate delivery point.

When the air film is applied, as the material is fed to the machine, the particles become stratified, the heaviest sinking to the bottom nearest the deck surface, the lightest rising to the top, and the intermediate-weight particles forming zones, or strata, between these extremes. With this vertical zoning or stratification of the material at the feed corner the propulsion across the deck surface causes the zones to separate and report at different points.

The air used is regulated, or its pressure reduced to the point where it is just sufficient to cause a stratification of the material and not great enough to cause a "boiling" or "blowing" of the particles. When so regulated the mass of particles becomes practically as fluid as water, the heavier elements readily settling through the mixture and the zones of segregated materials slipping easily, one from the other, to report at different points along the delivery edge.

Weighs Each Particle, Sorting Accordingly

As a matter of fact the machine is nothing but an extremely sensitive and accurate weighing device, using a film of air, under pressure, as a balance. However, it goes further and separates the particles which differ in weight, collecting those of similar specific gravity and discharging each class to a separate receptacle.

This machine originally was built for the separation of ores and other minerals, with a view to using it where there was a scarcity of water, the principal installations being in Mexico. Later it was adapted to the cleaning of seeds, nuts, cereals, etc., throughout the United States. To date more than four hundred machines have been installed for these purposes. In fact, this process is adapted to the cleaning or separation of all dry granular substances—that is, practically everything dug from the earth or grown from the soil—as well as the numerous artificial mixtures which are the result of combinations of such materials. Coals of all kinds are readily cleaned on this machine, particularly the fine sizes of purer coal, because the purer this material is the more readily does it separate from mechanically-mixed mineral matter. An abundance of

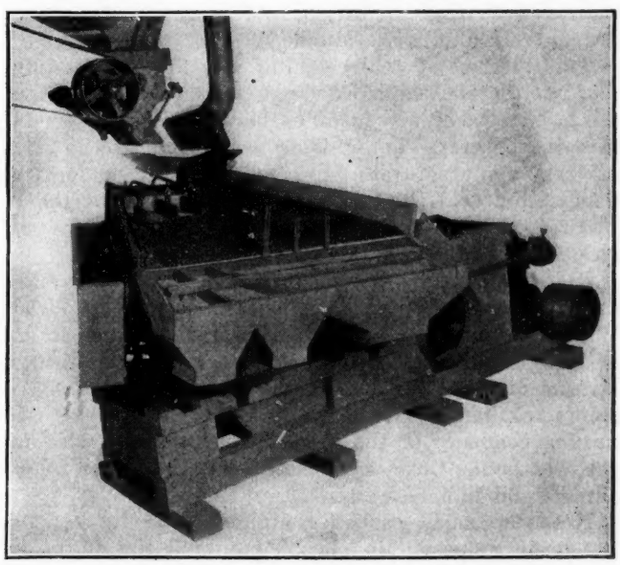


FIG. 1. FRONT VIEW OF TABLE FOR CLEANING COAL
This type of air table is designed to take off only two products, clean coal and clean refuse and no middlings. The lightness of the slate, which looks gray because it is dry, is readily apparent.

*Second part of article entitled "Dry Cleaning by Means of Tables," presented before the American Iron and Steel Institute. The preceding section of the article appeared last week and was entitled "Some of the Many Problems in Cleaning of Coal."

†General superintendent, United States Coal & Coke Co.

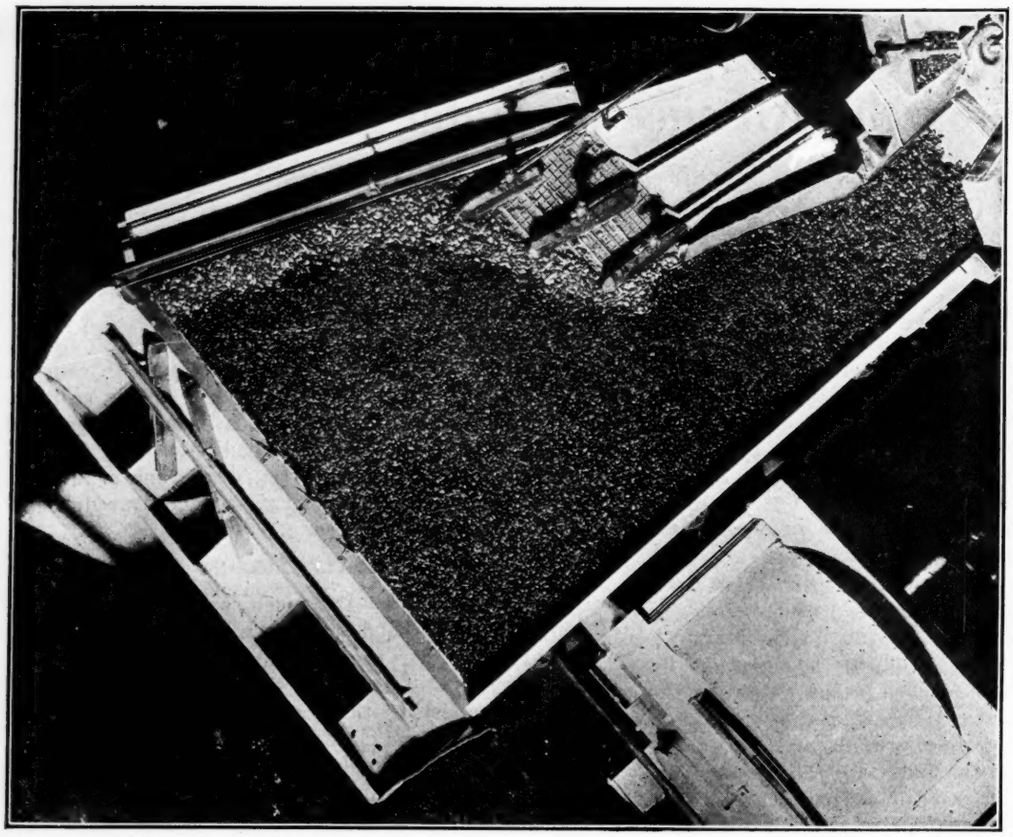


FIG. 2

Bird's Eye View

The slate can readily be detected here also. The air lifts it but little and so it is carried to one side. The coal passes over the corrugations almost as if they did not exist. It is a surprise to all who observe the table in action how soon and how assuredly the slate separates from the coal and exhibits by its lighter tint its preference for the side of the table on which it is to be taken off.

warm air of low humidity exists in the return of coal mines that could be readily applied to the use of these machines.

Best Coal for Metallurgical Purposes

Seams containing alternate thin layers of good coal and sulphur, slate or boney coal can be finely ground to break them apart, then separated; the good fine coal can be used for metallurgical purposes, while the remainder could be disposed of as its quality would warrant. Or the fines from such seams, which are now considered worthless, can be separated, then marketed as their quality would justify. Many such seams are found in the Middle West.

This method of coal cleaning was first used at the plant of the McAlester-Edwards Coal Co., at McAlester, Okla., the machinery installed being that used for the cleaning of ores. Later, tests were made at the plant of the manufacturers, in Dallas, Tex., under the supervision of J. R. Campbell, chief chemist of the H. C. Frick Coke Co., on a box-car load of Pocahontas coal shipped from Gary, W. Va., for testing purposes.

In the meantime the manufacturers made arrangements with the Central Pocahontas Coal Co., at Welch, W. Va., to install a small demonstration plant at one of its operations at Welch, where a number of demonstrations and tests are being conducted. Table I shows results of some of the tests run for a large coal-mining company in the Pocahontas field, and also for the St. Louis Coke & Chemical Co. on some of its Illinois and Indiana coals.

Note the small carbon content in the refuse, also the large reduction in phosphorus, and the slight increase in the sulphur, which would indicate that the coal carries the sulphur and the refuse the phosphorus, while the carbon is present as hydrocarbons, as no coal substance is visible to the naked eye in the refuse.

Table II opposite gives the result of a table test on one carload of seam No. 5 Indiana coal from mine No. 8, of the Ayrshire Coal Co., Oakland City, Ind., made April 25, 1921:

TABLE I. TEST ON 11,702 LB. POCAHONTAS NO. 3 SEAM COAL

Size of Coal	Screen Test Lb.	Screen Test Oz.	Crude Heads Lb.	Crude Heads Oz.	Clean Coal Lb.	Clean Coal Oz.	Refuse Tails Lb.	Refuse Tails Oz.	Dust Lb.	Dust Oz
2 in. on 1½ in.	.....	..	.....	..	....	..	...	..	...	..
1½ on 1 in....	12	8	.....	..	....	..	...	..	...	..
1 in. on ¾ in..	385	0	385	0	334	0	38	0	13	0
¾ in. on ½ in..	1,002	0	999	0	879	0	109	0	11	0
½ in. on ⅜ in..	1,280	8	1,280	0	1,164	0	109	0	7	0
⅜ in. on ¼ in..	797	0	797	0	720	0	70	8	6	8
¼ in. on ⅛ in..	2,722	8	2,522	8	2,351	0	159	0	12	8
⅛ in. on 16 in..	1,878	0	1,878	0	1,784	8	79	8	14	0
16 mesh on 26 mesh.....	763	0	763	0	718	0	35	8	9	8
Through 26-mesh.....	2,627	0	2,627	0	....	..	...	..	...	...
Totals.....	11,467	8	11,251	8	7,950	8	600	8	73	8

ANALYSES OF COAL

Size of Coal	Crude Heads Ash	Crude Heads Sulphur	Crude Heads Phos.	Clean Coal Ash	Clean Coal Sulphur	Clean Coal Phos.	Refuse Tails Ash	Refuse Tails Sulphur	Refuse Tails Phos.
1 in. on ¾ in.....	21.76	0.45	0.012	5.26	0.50	0.004	63.90	0.25	0.024
¾ in. on ½ in.....	14.23	0.45	0.008	5.58	0.50	0.003	68.11	0.23	0.030
½ in. on ⅜ in.....	12.67	0.47	0.009	6.75	0.64	0.003	66.22	0.23	0.026
⅜ in. on ¼ in.....	8.26	0.49	0.007	5.00	0.53	0.006	73.85	0.19	0.031
¼ in. on ⅛ in.....	9.41	0.50	0.008	3.95	0.53	0.003	71.94	0.21	0.031
⅛ in. on 16-mesh..	6.50	0.57	0.008	3.14	0.55	0.004	79.24	0.20	0.033
16 on 26-mesh...	9.80	0.53	0.007	4.28	0.56	0.003	77.37	0.22	0.032
Through 26-mesh	9.85	0.53	0.005	....	....	.....	.....	....	.....

ANALYSES OF DUST

Size	Ash	Sulphur	Phos.
1 in. on ¾ in.....	8.27	0.52	0.003
¾ in. on ½ in.....	6.64	0.49	0.006
½ in. on ⅜ in.....	8.62	0.54	0.008
⅜ in. on ¼ in.....	8.70	0.49	0.007
¼ in. on ⅛ in.....	10.80	0.48	0.008
⅛ in on 16 in.....	12.00	0.46	0.006
16 on 26-mesh.....	11.71	0.52	0.005

REMARKS.—1½-in. on 1-in. was not treated, as quantity (12 lb., 8 oz.) was too small. Samples for this test were taken in small portions, at regular intervals, over a period of three days. Through 26-in. mesh (2,627 lb.) was not treated on tables, as the smaller screens had not arrived at testing plant. Refuse removed was 0.0533 per cent of total amount treated on table. Lost in mechanical handling, 234 lb., 8 oz. Lost in mechanical handling on table, 216 lb.

TABLE II. TEST OF SEAM NO. 5 INDIANA COAL

Size of Coal	Crude Heads Lb.	Crude Heads Oz.	Clean Coal Lb.	Clean Coal Oz.	Refuse Tails Lb.	Refuse Tails Oz.	Dust Lb.	Dust Oz.
½ in. on ½ in...	535	8	516	8	17	8	1	8
¼ in. on ½ in...	463	12	445	0	17	0	1	12
¼ in. on ¼ in...	259	8	243	0	13	8	3	0
½ in. on ¼ in...	557	8	519	4	33	0	5	4
½ in. on 1/8 in...	226	8	205	8	19	0	2	0
16-mesh on 26-mesh.....	109	8	100	0	8	8	1	0
Totals.....	2,152	4	2,029	4	108	8	14	8

ANALYSES OF COAL

Size of Coal	Moisture	Crude Heads Ash	Crude Heads Sulphur	Crude Heads Phos.	Clean Coal Ash	Clean Coal Sulphur	Clean Coal Phos.	Refuse Tails Ash	Refuse Tails Sulphur
Dust.....	....	14.42	2.98	.....	.....	....	.....	.....	.....
½ in. on ½ in....	6.55	13.13	2.98	0.018	7.94	2.46	0.009	66.60	16.94
¼ in. on ½ in....	8.29	11.46	3.50	0.007	7.48	2.23	0.005	64.72	20.02
½ in. on ¼ in....	7.02	13.53	3.05	0.008	7.94	2.31	0.004	62.25	18.66
¼ in. on ¼ in....	8.93	11.63	2.99	0.007	8.32	2.18	0.004	62.00	13.91
½ in. on 16-mesh	8.47	15.00	3.11	0.007	9.00	2.26	0.005	75.11	11.49
16-mesh on 26-mesh.....	7.96	15.50	3.15	0.008	10.35	2.36	0.005	71.38	12.40
Through 26-mesh		16.56	3.52	0.008	.....	....	.....	.....	.....

The following tables give the results of a test on one carload of coal from seam No. 6 in Franklin County. The coal was taken from the Black Brier Mine of the St. Louis Coal & Iron Co., at Johnston City, Ill.

TABLE III. TEST OF ILLINOIS COAL

Size of Coal	Crude Heads Lb.	Crude Heads Oz.	Clean Coal Lb.	Clean Coal Oz.	Refuse Tails Lb.	Refuse Tails Oz.	Dust Lb.	Dust Oz.
½ in. on ½ in...	592	0	560	0	29	8	2	8
¼ in. on ½ in...	649	8	611	0	36	8	2	0
½ in. on ¼ in...	373	0	347	0	24	8	1	8
¼ in. on ¼ in...	800	8	739	0	58	8	3	0
½ in. on 1/8 in...	368	8	342	0	26	0	0	8
16 on 26-mesh.	180	0	161	0	17	8	1	8
Through 26-mesh	414	0	....	..	....	..	...	..
Totals.....	3,377	8	2,760	0	192	8	11	0

ANALYSES OF COAL

Size of Coal	Crude Heads Ash	Crude Heads Sulphur	Crude Heads Phos.	Clean Coal Ash	Clean Coal Sulphur	Clean Coal Phos.	Refuse Tails Ash	Refuse Tails Sulphur
Dust, ½–1/8 in.....	13.95	2.32	0.014	....	....	.....	.....	.....
½ in. on ½ in.....	10.20	2.31	0.006	7.31	1.65	0.003	65.00	8.92
¼ in. on ½ in.....	13.83	3.05	0.009	7.50	1.64	0.005	67.38	7.90
½ in. on ¼ in.....	13.24	2.27	0.007	7.22	1.54	0.003	72.00	8.62
¼ in. on ¼ in.....	11.91	2.22	0.006	6.62	1.57	0.003	72.00	8.78
½ in. on 16-mesh..	14.18	2.68	0.010	7.00	1.53	0.004	71.41	12.94
16 on 26-mesh.....	15.61	2.64	0.016	8.87	1.54	0.005	67.16	14.42
Through 26-mesh...	17.39	2.90	0.015	....	....	.....	.....	.....

From these analyses it will be noted that the effect of dry cleaning is to separate a large part of the refuse from the coal. It makes no difference in what relative quantities the dirt and coal appear, provided regular amounts are fed to the machine and it is kept in working condition. If there is a streak of coal in the bed that is inferior or high in ash or sulphur but contains a high fuel value this machine will separate it from the low-ash and low-sulphur coal and the slate at one operation; the high-ash and high-sulphur coal can be shipped or used for steam generation and the better grade of coal can be used for metallurgical purposes. It will be possible to get as many grades of product from one of these machines as exist in the coal bed.

The capacity of this machine is about three tons per hour when working on coal sized ½ to 1/8-in. mesh; on smaller sizes the capacity is less, and on larger more, with an average of about six tons per hour per machine for all grades. It is estimated that machines working on coal 1½ to 2 in. in size will clean ten tons per hour.

Spare the Water, Which Is Bad as Ash

A reliable dry-cleaning and separating machine in the coal industry will effect a great economic saving to the world. It will help conserve the coal resources by making seams and portions of seams merchantable that are now unmerchantable. It will help solve the coal-preparing difficulties of the fuel producer and insure the production of a clean coal in times of scarcity of labor as well as in periods of plentiful labor supply. It will eliminate engine failures on the railroads, or at least those arising from inferior fuel, and thereby admit of more constant and regular traffic. It will benefit the coal consumer by giving him good, pure fuel, which will increase the capacity of whatever device he may use for its consumption, be it cook stove, locomotive, coke oven or blast furnace. The efficiency of such consuming instrument will be increased in proportion to the reduction of the ash in the coal. In addition, it will save the consumer the money he is now paying for the water which the washer has added and at the same time it will save him the fuel which is now being wasted in eliminating this water.

Wages Paid British Coal Mine Workers

THE British Government issued the following figures, which show the estimated earnings per shift in May, 1921, of the highest-paid class of underground workers and the lowest-paid class of surface laborers in the coal-mining industry. These figures would have operated under the proposals put before the Miners' Federation by the Government and they will be those in effect in September of this year under an understanding that wages will not be reduced to exceed 2s. in July, 2s. 6d. in August and 3s. in September; after that they will be 20 per cent above pre-war wages.

BRITISH WAGES PRIOR TO WAR AND IN SEPTEMBER, 1921

District	Average Coal Getters on Piece Work Pre-War	Average Coal Getters on Piece Work May, 1921	Lowest Rate Surface Laborers Pre-War	Lowest Rate Surface Laborers May, 1921	Average All Adults Pre-War	Average All Adults May, 1921
Scotland.....	8s.3d.	19s.6d.	4s.	10s.	7s.2d.	15s.6d.
Northumberland.....	8/5	20/–	4s.6d.	10s.7d.	6/11	14/10
Durham.....	8/3	16/6	5/–	10/9	6/10	14/11
South Wales.....	9/4	20/–	5/3	11/9	7/4	16/5
Somerset.....	5/9	15/–	3/5	9/3	5/–	12/–
Forest of Dean.....	6/9	16/–	4/2	9/10	5/7	12/8
Bristol.....	6/10	16/–	3/5	8/–	5/–	12/6
Cumberland.....	8/2	20/–	4/4	11/3	6/11	14/11
Lancs. and Cheshire....	8/7	17/–	4/1	10/–	6/8	14/–
North Staffs.....	9/1	13/6*	4/4	9/7	6/7	12/9
North Wales.....	8/–	15/–	4/–	10/–	6/4	13/4
Shropshire.....	6/5	13/6*	3/5	9/2	5/1	12/9
South Staffs.....	7/1	13/6*	3/10	9/7	5/3	13/–
Cannock Chase.....	8/6	18/–	4/3	9/6	6/8	13/–
Warwickshire.....	10/1	20/–	4/2	9/4	6/7	13/8
South Derby.....	9/3	19/6	4/–	10/2	6/10	13/8
Leicester.....	7/–	17/–	4/5	10/6	6/4	13/9
Yorkshire.....	9/7	20/–	4/7	11/6	7/8	15/5
Notts. and N. Derby, Notts. and Erewash..	9/9	19/6	4/9	11/6	7/2	15/6

* Day-wage.

A three-shilling (73c.) reduction all over the federated area is assumed. The pre-war figure for surface laborers represents earnings of the lowest-paid classes. The full possible week for coal-getters is about 5½ days on average and for surface workers six days. The figures given for coal-getters on piece-work are necessarily estimates, as any piece-work earnings must depend upon output, but the calculation is based upon actual earnings, with allowances for the loss of certain war wage payments which have now ceased.

WAGE CONVERTED TO AMERICAN MONEY AT NORMAL EXCHANGE*

District	Average Coal Getters on Piece Work Pre-war	Average Coal Getters on Piece Work Sept., 1921	Lowest Rate Surface Laborers Pre-war	Lowest Rate Surface Laborers Sept., 1921	Average All Adults Pre-war	Average All Adults Sept., 1921
South Wales.....	$2.27	$4.87	$1.29	$2.86	$1.79	$4.00
Notts. and North Derby....	2.38	4.75	1.16	2.80	1.75	3.78
Notts. and Erewash.....						
Scotland.....	2.01	4.75	0.97	2.44	1.75	3.78
Yorkshire.....	2.34	4.87	1.12	2.80	1.87	3.76
Durham.....	2.01	4.02	1.22	2.62	1.67	3.64
Cumberland.....	1.99	4.87	1.06	3.29	1.69	3.64
Northumberland.....	2.05	4.87	1.10	2.58	1.69	3.62
Lancashire and Cheshire....	2.09	4.14	1.00	2.44	1.62	3.41
Leicester.....	1.71	4.14	1.08	2.56	1.54	3.35
South Derby.....	2.25	4.75	0.97	2.48	1.67	3.33
Warwickshire.....	2.46	4.87	1.02	2.27	1.60	3.33
North Wales.....	1.95	3.66	0.97	2.44	1.54	3.25
Cannock Chase.....	2.07	4.39	1.04	2.32	1.62	3.17
South Staffs.....	1.73	3.29†	0.93	2.34	1.28	3.17
Shropshire.....	1.56	3.29†	0.83	2.23	1.24	3.11
North Staffs.....	2.21	3.29†	1.06	2.34	1.60	3.11
Forest of Dean.....	1.65	3.90	1.02	2.40	1.36	3.00
Bristol.....	1.67	3.90	0.83	1.95	1.22	3.05
Somerset.....	1.39	3.66	0.83	2.25	1.22	2.92

* Arranged in order of average rates of pay for all adults May, 1921.

† Day wage. Rest on piece work.

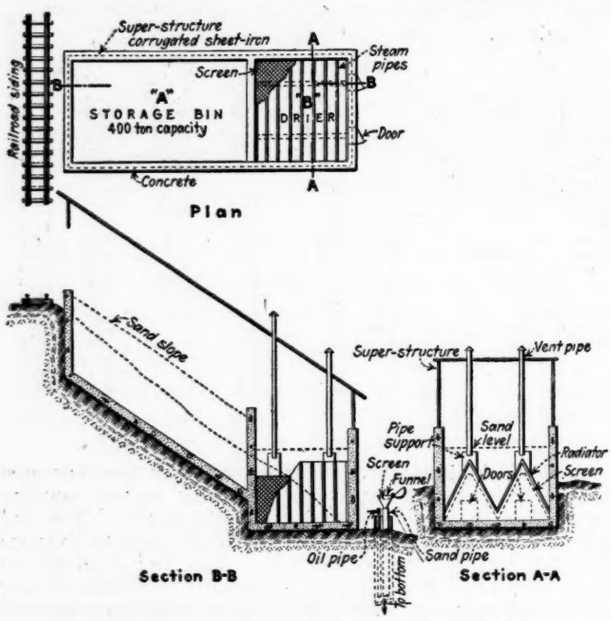
Sand Dried by Live Steam and Oil Heated By the Same Means Are Piped Into Mine

By Alphonse F. Brosky
Pittsburgh, Pa.

TWO unusual features at the No. 3 mine of the Pittsburgh Terminal Railroad & Coal Co., four miles southwest of Pittsburgh, Pa., are the arrangements for sand drying and for the supply of oil to the bottom of the shaft for car lubrication.

The standard coal-fired sand drier provided with a cone-shaped sand container is markedly inefficient, for the following reasons: (1) When using this type of equipment someone must be employed to do nothing but dry sand; (2) coal must be transported to the sand house periodically; (3) the sand does not flow freely and frequently clogs the lower opening through which it is supposed to run. Other disadvantages in the use of this old type of apparatus are the small capacity of each drier and the difficulty encountered in feeding fresh sand and removing it when dried.

The dry sand falls in a semicircular ring about the bottom of the drier and when a fresh supply is added



SAND DRIER AFFORDING LARGE CAPACITY

A radiator of pipes, each forming an inverted W, furnishes the heat. The dried sand falls through a screen placed immediately below the radiator. Vent pipes withdraw the moisture as fast as it is liberated. The sand is dropped by a pipe line into the mine.

at the top some of it usually spills over the side and mixes with that on the floor, resulting in a product not as dry as it should be. In its essential details the sand house at the plant mentioned consists of two compartments, *A* and *B*, which serve as a storage bin and a drying compartment respectively. The bin is built of concrete surmounted by a shed, the walls and roof of which are of corrugated sheet iron. The capacity of this bin is 400 tons and the slope of the floor is a little greater than the angle of repose of sand. This insures gravity replacement as the sand at the bottom is removed. A new supply consequently may be easily shoveled from a railroad car into the bin.

The drier itself consists of radiating pipes in the form of an inverted W, directly beneath which are located two sets of screens provided with truncated tops. Vent pipes lead from the top of the sand bed through the roof to the atmosphere. These create a draft, withdrawing the entrapped water vapor from around the radiators.

A 1-in. steam pipe supplies steam from the boilers to the 1¼-in. radiator sections. The steam, after partial condensation, passes through a ½-in. drain pipe to the atmosphere. Upon drying the sand falls through the screen to the two receiving bins beneath, from which doors open to the outside of the building. Through these the dried sand is removed. Just outside these doors is a borehole with an 8-in. pipe extending down to the underground workings. Within this casing are two smaller pipes, a 3-in. pipe for sand and a 1½-in. pipe for oil. Around these but within the 8-in. casing, air is allowed to circulate freely.

Large Covered Funnel Encloses Screen

The small pipes, as well as the casing, extend to the working level underground. Fitted to the upper end of the sand pipe is a large covered funnel in which is placed a screen. The dried sand is fed into this receptacle and, dropping down through the pipe, is delivered to a storage bin underground. Oil for use in the mine is emptied from a tank car into a storage tank. Here, if necessary, it is heated by a submerged steam coil and made easy flowing. From this reservoir it is drawn by a Bowser hand pump and delivered to the borehole, down which it travels to the bottom by gravity.

This system of sand-and-oil conveyance to the workings was devised by John Mahoney, general superintendent of the company. The merits of the sand drying and distributing plant may be summed up as follows: (1) Live steam from a near-by boiler house is utilized, resulting in high thermal efficiency; (2) the drier requires extremely little attention; (3) dry sand moves to the underground storage bin by gravity and during its passage does not become contaminated by foreign substances; (4) the capacity of the plant is large; (5) the means employed for moving the sand is cheap and effective.

Gas Mask for Carbon Monoxide Perfected

THE first public demonstration of a new gas mask invented to protect the wearer against carbon monoxide was given in the afternoon of May 26, in the special smoke room of the U. S. Bureau of Mines, Pittsburgh, Pa. It utilizes the special chemical mixture called Hopcalite, developed by the U. S. Bureau of Mines and the Chemical Warfare Service of the U. S. Army. The bureau for its research into the value of various types of gas masks, including those for the elimination of carbon monoxide, has a large smoke room especially adapted for testing purposes and it was this room that was used for the demonstration.

In this test two men entered the smoke room, the air of which contained 1 per cent of carbon monoxide. One of the men carried a canary bird into the room in order that its actions might indicate to the observers the poisonous nature of the atmosphere. The canary bird collapsed in 45 seconds and was immediately removed to fresh air, where it was revived with oxygen.

Frequent tests were made with the M. S. A. carbon-monoxide detector to show the observers the strength of the gas. The wearers of the mask remained in the atmosphere for 30 minutes doing vigorous work part

of the time, and experienced no ill effects whatever from the carbon monoxide. The gas masks gave perfect protection throughout the entire period of the test.

The new gas mask will afford protection in higher percentages of carbon monoxide than 1 per cent, yet if a man breathe that percentage it will kill him in a few minutes' time. In about half an hour, however, 0.1 per cent of carbon monoxide will seriously affect a man who is working and is therefore breathing hard, and 0.2 per cent will affect him seriously in about ten minutes. The mask is manufactured by the Mine Safety Appliances Co., of Pittsburgh, Pa.

Plank Platform Lifted and Lowered by Cage Protects Men from Falling Into Shaft

By R. W. Mayer
California, Pa.

OPEN shafts are always a source of danger. Many men are recorded each year as falling down shafts or being killed or injured by objects which become dislodged and fall on those below.

To obviate this danger the Canadian Collieries, Ltd., of Cumberland, B. C., has entirely covered its shaft openings with platforms made of 2-in. plank. These inclose or are built around the hoisting cable and rise and fall with the cage when it rises above the landing. In this movement the platforms are directed by, or slide along, the cage guides.

The top of the cage is provided with extra timbers designed to receive and support the platform or shaft cover. In its upward movement the cage lifts the platform with it to the end of the hoist. When the cage descends, the platform descends with it until the floor or landing is reached. There the shaft cover is caught and it remains in that position, effectually covering the opening, until the platform is again lifted by the ascending cage. Near the end of the hoist when the cage and platform come in contact the speed is so reduced that the two meet without appreciable shock and no damage is done to either. In descending the cage has not had time to gain any great speed before the platform is caught and comes to rest on its supporting timbers.

Device for Holding Reinforcement While It Is Being Embedded in Gunite

WHEN the attempt was made some years ago to apply reinforced gunite for the fireproofing of mines and the building of walls difficulty was encountered in obtaining a device that would satisfactorily hold the reinforcing wire or expanded metal away from the surface to be coated until it could be embedded in the gunite. The solution of this problem, shown in the illustrations below, is known as a gunite furring post.

This device serves to support and at the same time to secure the reinforcing material in such manner that it may be thoroughly embedded in the layer of gunite. When this material is applied over a wooden surface an ordinary wire nail holds fabric, post and surface securely together and in their proper relation. (See Fig. 1.) When applied over a metallic surface, as in roof or floor slabs, the post acts simply as a support, as shown in Fig. 2.

At first these posts were made of light metal, but it was found that when so constructed they were too easily crushed, and accordingly they were made heavier.

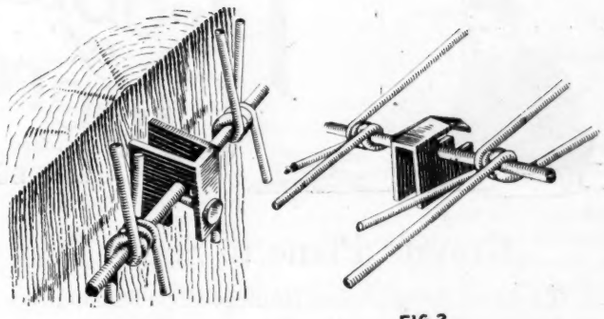


FIG. 1 FIG. 2

KEEPS REINFORCING WIRE IN PLACE FOR GUNITE

As now built they rarely crush even when stepped on by a man of ordinary weight. The Cement-Gun Construction Co. of Chicago, Ill., has the patent rights.

Cost of Preparing Pulverized Coal

DURING 1920 the cost of preparing coal, says *Power* of July 5, 1921, in the power plant of the Clarkdale Smelter was as follows:

Unloading, storing and reclaiming coal, per ton	$0.07
Conveying and primary crushing, per ton	0.09
Drying and disintegrating, per ton	0.30
Pulverizing	0.52
Total operating costs	$0.98

These figures include power, labor, supplies, repairs and plant expense, but do not include depreciation and other fixed charges. The installation costs of a pulverizing plant are as follows:

Storage and reclaiming plant, per ton storage capacity	$13.00
Primary crushing plant, per ton daily capacity	32.00
Drying and disintegrating plant, per ton, daily capacity	286.00
Pulverizing plant, per ton daily capacity	402.00

With a 300-ton plant the investment, with a seven-day storage plant, would be around $243,000; if interest, depreciation and taxes are assumed to equal 15 per cent, then the fixed charges per ton total $100 per day, or 33c. per ton. The entire pulverizing costs then become $1.31 per ton.

Coal Wage Costs Per Ton in Britain

IN VIEW of the dispute in the British coal-mining areas the following table, which shows the rising wage costs per ton, is interesting:

District	September Quarter 1920 British Money	September Quarter 1920 American Money	March 1921 British Money	March 1921 American Money
Derby, Nottingham and Leicester	20s. 8.45d.	$5.05	21s. 6.91d.	$5.26
Yorkshire	22s. 4.65d.	5.45	23s. 2.53d.	5.66
Stafford, Shropshire, Worcester and Warwick	23s. 9.68d.	5.80	25s. 2.52d.	6.14
Durham	25s. 6.73d.	6.23	26s. 8.36d.	6.51
Northumberland	26s. 2.17d.	6.38	29s. 7.33d.	7.21
Scotland	26s. 8.35d.	6.51	27s. 1.25d.	6.61
Gloucester, Somerset and Kent	28s. 4.65d.	6.91	34s. 4.79d.	8.38
Lancashire, Cheshire and North Wales	29s. 6.53d.	7.20	30s. 1.09d.	7.33
South Wales	32s. 1.96d.	7.84	40s. 4.12d.	9.83
Cumberland and Westmorland	33s. 8.27d.	8.21	35s. 5.57d.	8.64

Thus it will be seen that in every district there has been a rise in wage costs, especially in South Wales, Gloucester and Northumberland, where the depression in the coal-exporting districts has inflated the production costs. All conversions from British to American money are at normal rates of exchange and consequently do not show the real costs with which the exporter must contend.

When Strikes Get Serious

"One result of the coal strike," says the *Daily Express*, "will be a shortage of beer." We have thought all along that the miners' strike would sooner or later lead to something serious.—*Punch*.

Problems of Operating Men

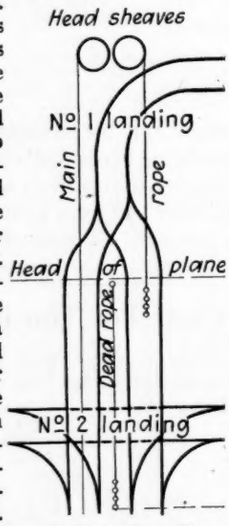
Edited by James T. Beard

Gravity Plane to Serve Two Mines

To Avoid Lengthening Haulage Rope Run Out the Cars from the Lower Mine Onto the Plane and Block Them There Ready To Be Coupled to the Next Descending Trip from the Upper Mine

PROBLEMS in gravity-plane haulage have always interested me and I was particularly taken with the one presented in *Coal Age*, June 2, page 999, where a superintendent contemplates serving two mines with a single gravity plane 1,100 ft. in length, the lower mine (No. 2) being a more recent opening and located 100 ft. down the incline from the old mine (No. 1).

After studying carefully the suggestions offered by the editor, in replying to this inquiry, I am inclined to think that there would be some difficulty experienced in keeping the two ropes from getting entangled should an extra length of rope be provided to reach from No. 1 to No. 2 landing. This rope, it was stated, would lie at the side of the track till needed to lower a trip from No.-2 landing, when it would be coupled to the main rope for that purpose. With this preliminary, allow me to give my idea of the best method to adopt, in order to avoid the use of an extra length of rope, and preclude any possibility of its becoming entangled.



Referring to the figure, install a switch on the incline at a point suitable to make connection with the track on No.-2 level, as indicated by the dotted lines in the figure and already explained in the reply to this inquiry. Also, install a good safety block at a point on the incline a sufficient distance below the switch to hold the number of cars it is desired to lower from No.-2 mine.

This being done, the cars from No. 2 are first lowered from that landing onto the incline where they are held by the block until the trip from No. 1 is lowered. The No.-2 cars are then coupled to the trip and the engineer takes up sufficient slack to permit the safety block to be shifted, after which he lowers the entire trip.

A similar switch can be installed on the opposite track and a like safety block provided that can be operated and made to hold the empties for No. 2 when that trip has reached this point of the incline. Again, the engineer slacks back enough to permit the No.-2 empties to be uncoupled.

The empties for No. 2 having been uncoupled from the trip, the latter is hoisted to No.-1 landing, after which the No.-2 cars are coupled to the auxiliary rope from that level and drawn from the incline, by a runabout track that passes under the plane, in the manner indicated and explained previously by the editor.

The plane can be arranged, if desired, for the loads from No.-2 mine to travel the right-hand track only, the empties for that mine being hoisted on the left-hand track. This, however, would necessitate serving No.-2 mine only each alternate trip. For some time past, we have been operating an arrangement similar to the one I have mentioned and the scheme has proved successful. J. B. K.

Confluence, Pa.

[It should be stated here that, in adjusting the system proposed by this correspondent, which has some features favoring its use, ample provision must be made for sustaining the excess of load on the engine when the additional cars from No.-2 mine are coupled to the trip, and the No.-2 empties are removed while the trip is still 100 ft. above the foot of the incline.

It will be observed this causes a variable load to be controlled, and it will be necessary to strike a suitable balance between the two conditions. When No.-1 cars are descending from that landing to No. 2, a comparatively light load is in counter-balance with a full load of empties. On the other hand, when the No.-2 empties have been detached from the system the full loaded trip is offset by the comparatively light empty cars for No. 1 mine. Our correspondent has not mentioned this point.—EDITOR.]

SECOND LETTER

THE question of arranging a gravity plane so as to enable it to serve two mines, the new opening (No. 2) being 100 ft. down the incline from the old mine (No. 1), appeals to me as a simple proposition. As has already been stated in the reply to this inquiry, a short length of rope sufficient to reach from No. 1 to No. 2 landing must be employed in order to handle the coal and empties for the lower opening.

Instead of a single one, I would use two of these shorter ropes, however, which may well be called "dead ropes," inasmuch as they are kept lying at the side of the track when the system is serving No. 1 mine.

Using a single rope, it will only be possible to change the service from No. 1 to No. 2 mine when the end of the main rope at the top of the plane is on the side where the dead rope lies; although it is possible, of course, to have the dead rope when idle lie between the two tracks and in that case but one rope would be necessary.

SHOWING CAPPING OF ROPE ENDS

The ends of all the ropes must be capped in a manner suitable for coupling, and a short length of coupling chain should be used to attach the rope to the first car when hoisting or lowering a trip.

The operation of the system is about as follows: An empty trip having arrived at No.-1 landing and it being desired to lower coal and hoist empties for No.-2 mine, the headman at No.-1 landing uncouples the short coupling chain on the main rope and couples in its place the end of the dead rope lying on the side of the track.

At the same time, the headman at No.-2 landing couples the short chain on the lower end of the dead rope to the loaded trip, which has been previously run out onto the incline from No.-2 landing and blocked. When all is ready and the signal is given from No.-2 landing and the foot of the incline the system is started.

In my sketch, I have indicated how the coupling of the two ropes together, or the short chain to the end of either rope is effected. The capping at each rope end is arranged to hold a clevis or a pin. A clevis is attached to each end of the main rope and the lower end of the dead rope. The clevis pin is made secure by a cotter pin or other lock. The clevis pin when inserted is passed through the first link of the chain or the hole in the capping of the dead rope, which makes a simple and safe method of coupling, either the

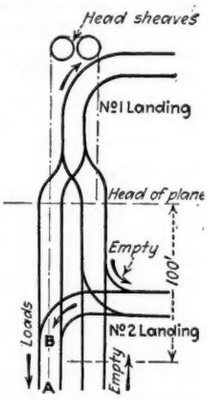
chain or the rope. This method of coupling is the same as that used in coupling ropes in main-and-tailrope haulage. WILLIAM DICKINSON.

Whipple, W. Va.

THIRD LETTER

REPLYING to the request for suggestions regarding the utilizing of a gravity plane serving one mine and adapting it to handle the coal from another opening lower down the slope, permit me to offer the following plan:

Make one of the two tracks on the incline the loaded and the other the empty track. Connect these tracks by switches in the manner shown in the accompanying figure. It will be observed that the empty switch from No.-2 landing is turned up the incline, while the loaded switch crosses over the empty track and is turned down the incline on the other side. All the switches are automatic and require no attention.



Following is the method of operation: Assuming that a loaded trip is standing on each landing ready to be lowered, No.-2 trip is first run out onto the incline and lowered by suitable means to the car-stop or block located on the incline at A. There it is held awaiting the lowering of No.-1 trip to that point. When this is done and the two trips have been coupled together the block is released and the double trip allowed to descend the plane to the foot of the incline, by gravity.

In the same time, the empty trip has been hauled up the incline and reached the head of the plant at No.-1 landing. The empty cars for No.-2 mine are then uncoupled and run by gravity down the incline, and through the automatic switch to No.-2 landing, which completes the cycle of operation.

PLAN MUST CONFORM TO THE LOCAL CONDITIONS

This general idea may have to be modified to suit local conditions. Without exact data regarding the inclination of the plane, weight of cars loaded and empty, number of cars per trip, etc., it is manifestly impossible to work out the scheme in detail. I will refer briefly to some of these matters that are essential to the success of the proposition.

For example, starting again from the beginning of the cycle and assuming that both mines are producing equal quantities of coal and served by cars of like weight and capacity, it is evident that the loaded trip from No.-1 mine must be able to start and haul up the grade twice its number of empties, until the double trip is made up at No.-2 landing. In order to do this, however, it will be necessary to establish a steeper grade from No.-1 to No.-2 landing that will meet this condition.

Again, it is probable that an auxiliary drum and rope will be required to lower the loaded trip from No.-2 landing to the car-stop on the incline to await the trip from No.-1 mine.

It is also probable that suitable means must be employed to lower the empties to No.-2 landing, after they have been hauled to the head of the plane and uncoupled from the main trip. Under some conditions, it may be advisable not to haul these cars further up the incline than is necessary to drop them into the switch leading to No.-2 mine.

EXACT DATA NECESSARY

All of these details can only be worked out from a knowledge of the situation and the necesssary data for that purpose. It should be mentioned here that the strain on the rope when handling a double trip from the two mines will probably be such as to require using a stronger haulage rope.

It will also be necessary to increase the brake power on the winding drum or headsheaves, in order to suitably control the movement of the cars on the incline. If this is not done, smaller trips can be hauled so as to bring the load within the capacity of the ropes in use. JOHN S. WATTS,

Consulting Mechanical Engineer.

New Glasgow, N. S.

FOURTH LETTER

MY PLAN of treating the problem presented in *Coal Age*, June 2, p. 999, in regard to making a single incline serve two mines, one located above the other on the same hillslope, will probably differ from others that may be offered, but it appeals to me as practicable.

In order to illustrate this plan, I have prepared a diagramatic sketch, showing the length measured on the incline between the two landings or mine openings and the foot of the incline, and the relation of the descending and ascending loaded and empty trips at the moment of clearing each other, midway on the incline.

RECONSTRUCT A PORTION OF INCLINE TO REDUCE TRACK

My idea of providing a construction or arrangement that will be adapted to serve both mines may not be strictly applicable to the present case, as it involves the reconstruction of a portion of the present incline. However, I believe it will be of interest in this connection, and will describe it briefly.

The plan makes possible a considerable shortening of the track required on the incline. Instead of the 1,100 ft. of double track necessary in this case, my scheme would call for but 700 ft. of double track on the lower end of the plane, with 400 ft. of single track above it.

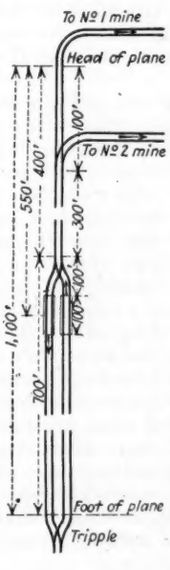
The middle point on an incline 1,100 ft. long is 550 ft. below the head of the plane. As indicated in the diagram, at the moment when the head end of the ascending empty trip is opposite the rear end of the descending loaded trip, both trips should be on straight track and clear of each other.

Now, assuming trips of ten cars are to be handled, occupying approximately 100 ft. of track, each, the head end of the ascending trip and the rear end of the descending trip being opposite each other, are each 50 ft. above the midway point on the incline, or 500 ft. below the head of the plane. Allowing another 100 ft. up the incline to the switch where the two tracks join as shown in the diagram, leaves 400 ft. of single track reaching from this switch to the head of the plane.

Viewing the situation from this angle, it would seem practicable, in providing for the most economical construction, to take out the switch on No.-1 landing at the head of the plane, and use but a single track on the first 400 ft. of the plane.

ADVANTAGE GAINED IN THE USE OF SINGLE TRACK

The use of a single track in the upper portion of the plane will have several advantages. Perhaps, the most important is that it will greatly simplify the proposition in respect to switches and crossovers required at No.-2 landing. The plan is more economical of material and the cost of upkeep will be less than when a full double track incline is used. In operating the system and handling coal from No.-2 mine, the extra length of rope required to be coupled to the main rope can be used without danger of interfering with haulage from No.-1 mine. When not in use this rope will lie at the side of the track.



Hooversville, Pa. P. M. WEIGLE.

[In connection with this suggestion, the question will be asked by many, "Why not extend the same principle of single tracking the incline to the lower portion of the plane, leaving only double track for the trips to pass each other safely when hauling from either mine?"

When serving No.-2 mine, the length of haul is 1,000 ft. and the middle point is then 500 ft. above the foot of the incline. At the moment the head end of the descending loaded trip is opposite the rear end of the ascending empty trip, they will be 450 ft. above the foot of the incline; and, allowing another 100 ft. to the lower switch of the passing track will make this switch 350 ft. above the foot of the incline.

In this arrangement the distance between the two switches of the passing track is 350 ft., which is the total length of double track required, leaving 1,100 — 350 = 750 ft. of single track throughout the incline.—EDITOR.]

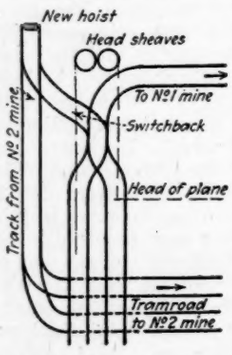
FIFTH LETTER

THE plan referred to in a recent inquiry in *Coal Age*, in respect to making a single incline plane serve two openings at different elevations on a hillside, reminds me of the many experiments we made in attempting a like proposition at our plant, some time since, and all without avail.

In the start, we extended our tipple landing to accommodate longer trips and the handling of more cars. Again, we installed a car-haul, at a point a short distance up the incline from the tipple, for the purpose of hauling the empty cars up to that point where they could be coupled to the end of the main rope, whenever it was desired to handle a trip from the lower mine.

Besides these attempts, we tried other schemes too numerous to mention, but finally gave them all up as being impracticable and causing much delay in putting out coal from the upper mine, which was greatly hampered by the new arrangement. In most of these attempts we had trouble with the ropes at the cross-overs that were required to bring No.-2 coal out onto the incline.

We are now working successfully an entrely different scheme. This consists in establishing a new hoist just above No.-1 landing and on one side of the incline, as shown in the accompanying figure. The empty and loaded tram tracks from No.-2 mine are carried across the incline by an overhead bridge. If conditions should require these tracks could be carried under instead of over the incline.



After crossing the incline, the two tracks are brought together by a switch, and No.-2 loads and empties are handled from that point over a single track, reaching to the new hoist above No.-1 landing. As shown in the figure, this single track is connected by a switchback with the main tramroad from No.-1 mine, at the head of the incline.

This arrangement enables us to haul the loaded cars from No.-2 landing up to the point mentioned, above No. 1, and drop them by gravity to the head of the main incline, by which they are then lowered to the tipple, either separately or in a combined trip of cars from both mines.

Similarly, empty cars for No.-2 mine are hoisted over the switchback and dropped down the new incline to No.-2 landing. This plan has proved very satisfactory and enabled us to overcome the trouble at first experienced.

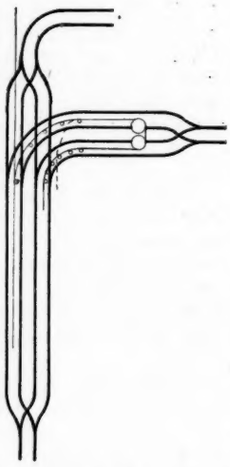
D. S. ALLISON.

Salt Lake City, Utah.

SIXTH LETTER

IN ANSWER to the inquiry in reference to handling the output from two openings 100 ft. apart, measured on the incline, and using the same plane, permit me to describe briefly a certain rope haulage in use at a mine where I was employed when a boy. If I am rightly informed, the mine is still operating the same system.

The plan was what was known as a modification of the endless-and-tailrope systems of haulage, which was something new at that time.



Since then, the method has been employed in a number of mines where branch haulage is required to bring the coal from different sections of a mine out to the main road. In applying this system to handle the coal from two openings over the same incline, as shown in the accompanying figure, it was necessary to first install a separate pair of headsheaves on both the upper and the lower landings. What I will call the main rope passed from the upper landing back over the headsheaves at the top of the plane and reached from that point down the incline to the tipple.

At No.-2 landing a short length or "branch rope" passed back over the headsheaves at that place and was carried around rollers in the track connecting this landing with the track on the incline. At the branch switch on the incline, there was a special coupling in the main rope.

After lowering a trip of cars from the upper landing to the tipple, if it was desired to have the next trip handle the coal from the lower landing the main rope was uncoupled at the branch switch and coupled to the branch rope, the other end of which was already attached to the loaded trip standing on that landing. When everything was ready, this loaded trip was started down the incline, while a trip of empty cars was pulled up the plane and through the switch onto the lower landing, reaching that point just as the loaded trip arrives at the tipple.

In this arrangement, it will be necessary to spike good guardrails to the track on the curve leading to the lower landing, in order to hold the cars to the rails and prevent derailment when rounding that curve. Special couplings should be used, made of plow steel to give them the required strength. In each case, the headsheave should be placed under the track, which will have a tendency to hold the rope well down on the rollers.

From the description I have given, the operation of this system should be clearly understood. In the figure, I have indicated by the dotted line the position of the branch rope at the lower landing when disconnected from the main rope. WILLIAM D. ROBERTS.

Morgantown, W. Va.

Inquiries Of General Interest

Authority of Examining Board

Correspondent, Questioning the Authority of an Examining Board to Omit the Oral Examination of Candidates Who Fail to Pass Their Written Examination, Appeals to *Coal Age* and Readers

AT A RECENT examination of candidates for the position of mine inspector in the bituminous region of Pennsylvania, the examining board sitting at Pittsburgh refused to give the oral examination to any candidate who failed to receive the required percentage in his written examination.

As I understand the mining law, it requires the appointment of an examining board whose duty shall be to conduct the examination of candidates on a certain day giving to each applicant a written and an oral examination.

The question I want to ask is, Has an examining board any authority to set aside the oral examination of a candidate as required by law? Granting that a candidate has failed to pass his written examination and, on that account, could not receive a certificate from the board even if he passed the oral examination with flying colors, does that fact allow the board to omit the oral examination of such a candidate?

Cannot the candidate claim the right to be given the full examination, both written and oral, required by law? To

my mind, the act of this examining board, in refusing to give a candidate his oral examination, impairs the entire examination of other candidates who cannot be legally appointed inspectors of mines.

I hope to see this question answered and discussed in *Coal Age*. If mine workers are required to obey the law and are to be prosecuted for its violation, must not officials who fail to do the same suffer likewise? INQUIRER.

Johnstown, Pa.

In our opinion, this correspondent has inadvertently read into the law more than the words convey. Art. 19, Sec. 4, of the Bituminous Mine Law of Pennsylvania, reads as follows: "The principal examination shall be in writing, and each applicant shall also undergo an oral examination pertaining to explosive gas, safety lamps, methods of ventilation and mine management."

In our judgment, the words "shall also undergo" place the obligation on the candidate and not on the examining board. The law does not state that the applicant shall be given, but shall undergo an oral examination.

In providing for the examination and certification of candidates for official mining positions, the evident intention of the lawmakers was that the examining board should determine the fitness of candidates by giving them an examination. The law distinctly makes the written examination the principal one.

It seems logical to conclude that a candidate having failed to pass the written examination to the satisfaction of the board, nothing more is required to determine that he is incompetent and unqualified for the position. That being the case, it should conclude the matter and relieve the examining board from going further in a vain attempt to ascertain the candidate's fitness.

If an examining board omit an oral examination after a candidate has failed in the written examination, having already determined that the candidate is unqualified, it has fulfilled the purpose of its appointment.

It can be further stated that Sec. 2 of the article previously mentioned authorizes the examining board to "formulate rules for conducting the examination." We are advised by the Department of Mines that, in this case, the chairman of the examining board announced to the assembled candidates that the oral examination would not be given to those who failed to make the percentage required in the written examination, and no protest was made by any of the candidates present, who thus obligated themselves to abide by this ruling of the board. It is readily conceded that an examination conducted in a manner that fails to comply with the requirements of the law would not be legal, nor would any appointment made as the result of such examination be legal. We shall be glad to learn the opinions of others regarding the matter.

Examination Questions Answered

Pennsylvania Bituminous Firebosses' Examination, April 5-8, 1921

(Selected Questions)

QUESTION—*What are the lawful duties of a fireboss? State briefly.*

ANSWER—The law requires a fireboss to examine carefully every working place in his district before the men enter the mine for work. He must also examine all places adjacent to live workings and all roads, travelways and unfenced roads leading to abandoned places and falls. Before proceeding, he must see that the air current is traveling in its proper course. He must use no other light than that of an approved safety lamp and start his examination not more than three hours before the time appointed for work. He must mark the date of the examination on the face and side of each place examined as evidence of his work having been done. At the entrance of any place where gas or other danger is discovered, he must place a danger signal to warn persons not to enter such a place. On completing his examination, he must enter a report of the same in a book kept for that purpose and specify any danger he may have found, stating its character and location. The fireboss is required to make a second examination of the working places in his district during working hours.

QUESTION—*When and where would you place a danger board and how and by whom should the danger be removed?*

ANSWER—The law requires a danger board to be placed at the entrance of the mine by the fireboss when he enters to make his first examination in the morning. He must also place a danger board at the entrance to any place where he may find danger. It is the duty of the mine foreman or the fireboss by his direction, to see that all dangers discovered are promptly removed by competent workmen under their supervision.

QUESTION—*Describe the construction of a safety lamp for official use by a fireboss and state with what lamp you are most familiar.*

ANSWER—A safety lamp designed for the use of a fireboss consists of two essential parts, the oil vessel and a gauze chimney. The common unbonneted Davy lamp has always been a favorite with firebosses. The brass oil vessel of this lamp is equipped with a round-wick burner and a pricker for raising or lowering the wick. The oil burned is a good quality of sperm or cottonseed oil. The gauze chimney surmounting and attached to the oil vessel is made of standard, steel-wire mesh having 28 wires (28 B.w.g.) to the inch, or 784 openings per square inch. The chimney is cylindrical having a diameter of 1 9-16 in. and a height varying from 4½ to 6 in., in different types of this lamp. The main gauze is supplemented by a gauze cap that fits over the top of the chimney. The chimney is held in place at the top by a brass ring, supported on three brass standards or rods. A brass shield or cap surmounts the standards and to this a handle is attached for carrying the lamp. A screw-plug secures the chimney to the oil vessel.

QUESTION—*Name at least one dangerous practice that is frequently indulged in by the following persons: Miners, motormen, brakemen, rockmen, timbermen, tracklayers and wiremen.*

ANSWER—A miner may neglect to set needed timber, mine his coal without spragging, use too short a fuse, or bite off the end of the match of a squib, in blasting. A motorman may jump on or off his motor to open a door or throw a switch, while the machine is running. Brakemen may fail to properly sprag or apply the necessary brakes on a steep grade. Bratticemen may fail to set a sufficient number of posts or properly hang the canvas or extend a brattice to a sufficient distance to sweep the gas from the face of a place or heading. Rockmen may overcharge a hole, or fail to set temporary timbers for their protection when taking down loose rock. Timbermen will often fail to protect themselves in like manner when replacing broken timbers. Trackmen may leave old rails and other material in an unsafe position at the side of the road, or stow away the same where it will obstruct the clearance space or shelter holes along the road. Wiremen may fail to shut off the power, before attempting to make necessary changes in the wiring or other electrical installations.

QUESTION—*What first-aid treatment would you give to a workman whose eye has been injured?*

ANSWER—Remove at once any speck of coal or other foreign matter observed on the eye. If the injury is severe, while waiting for the doctor apply absorbent cotton or soft cloth soaked in cool water, bandaging the same, not too tightly, but sufficiently so to prevent movement of the eyelid. Keep the cloth and bandage constantly wet with cool water to prevent inflammation. A few drops of olive oil in the eye will help to allay irritation. Never allow the injured one to rub his eye.

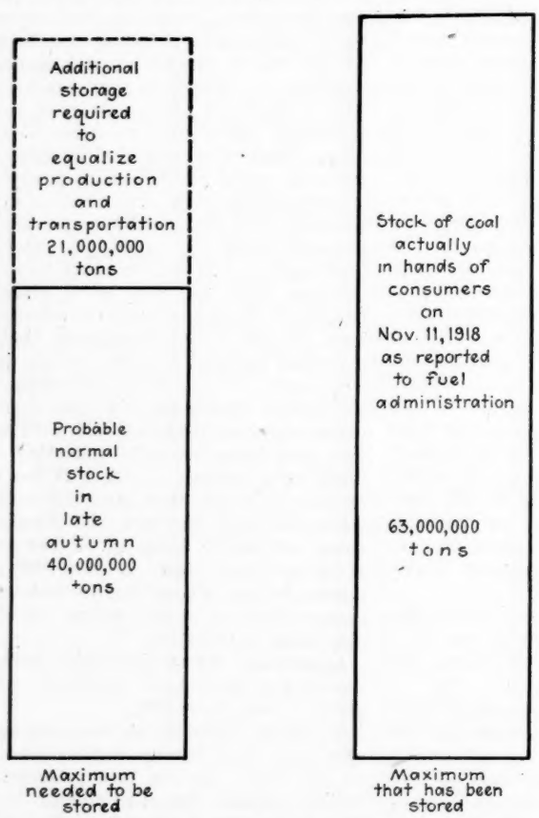
How Shall Irregular Operation of the Bituminous Coal Industry Be Remedied?*

Suggested Correctives Include Storage, Summer Discount in Prices, Sliding Wage Scale and Seasonal Freight Rates—Operators Propose Rebate on Freight Charges Paid on Coal Actually Put in Storage

By F. G. Tryon†

IT HAS been frequently pointed out that as long as consumption is seasonal—and in a climate like that of North America it must always be seasonal—the only way to insure steady working time at the mine is to provide adequate storage facilities at some point between the coal in the ground and the furnace of the consumer.

The extension of the practice of storage turns upon a technical problem—the feasibility of storing coal on a large scale without spontaneous combustion and undue losses through escape of volatile matter or physical degradation. The coals of the Appalachian region can generally be stored better than those of the Mississippi Valley. As to the feasibility of stocking the former there can be no doubt, for they are stored by the Northwestern Coal Dock operators in enormous quantities under trying conditions. There is a widespread belief that the coals of the Mississippi Valley—Illinois, Indiana, Western Kentucky and the fields from Iowa to Texas—will not endure storage. Careful investigation by the engineers who have devoted most attention to this subject, however, indicates that with due precautions these coals also many be stored. Of course the precautions necessary cost money, and to be economically practicable they must be offset by beneficial results.


Additional storage required to equalize production and transportation 21,000,000 tons
Probable normal stock in late autumn 40,000,000 tons
Maximum needed to be stored
Stock of coal actually in hands of consumers on Nov. 11, 1918 as reported to fuel administration
63,000,000 tons
Maximum that has been stored

STORAGE COAL REQUIRED TO EQUALIZE OUTPUT

To overcome the seasonal swing in production and transportation of soft coal would require putting in storage between March and August about 21,000,000 tons over and above what is already stored. This would make the total quantity in storage no greater than the actual stock on the day of the Armistice.

*The first part of this article, entitled "Injurious Effects of Irregular Operation of the Bituminous Coal Industry," appeared in *Coal Age* last week. Published by permission of the director, U. S. Geological Survey.

†In charge of coal statistics, U. S. Geological Survey.

The most convincing demonstration of the practicability of storing Western coal in large quantities is seen in the fact that on the day of the armistice consumers had on hand 63,000,000 tons of soft coal, an amount sufficient for six weeks and three days' supply. Millions of tons of this coal was mined in the Middle West. In fact, Appalachian coal had been zoned out of most of the Mississippi Valley except for small quantities moving under permit. Although the purchasers of this Western coal reported many fires, only a small part of it burned up or blew away, and the carry-over into 1919 was so heavy as to depress the market for months thereafter. Western coal has been stored in quantities sufficient to stabilize the demand. What was done during the war can be done again, if only the necessary incentive is provided.

Storage at Mine of Only Limited Value

Storage at the Mine.—It is frequently urged by those who are unfamiliar with mining conditions in America that stocks of coal should be maintained at the mouth of the mines. This is, indeed, the prevailing practice in parts of Belgium and other countries on the Continent, but under the conditions that exist in the United States this practice would be of value only in evening up the small irregularities in operation during a given week. It would have no influence on the seasonal movement of coal from mine to consumer, and would therefore leave untouched one of the most glaring ill effects of the present system—the unequal load upon the railroads. Neither would it furnish a reserve for the protection of the consumer against a breakdown in transportation, and experience during the war has shown that actual suffering and the closing down of plants are due more to delays in the delivery of loaded coal than to diminution in the rate of output at the mines. So many consumers depend upon the mobile reserve of coal in transit that any interruption to normal movement on the railroads means a scarcity of coal. In addition to these facts the extra cost of putting the coal in storage and reclaiming it militates against storage at the mine. As someone has aptly put it, the cheapest place to store coal at the mine is underground in the bed.

Storage on Route.—Accumulations of coal may sometimes be kept advantageously at points along the way from mine to place of use. Examples of this practice are seen in the great storage yards that were constructed years ago by the producers of anthracite. These yards are used as reservoirs to receive the excess production in summer and to furnish, on the approach of winter, the additional tonnage called for by the heavier demand at that season. It is noteworthy that they were established near points of greatest consumption—close to New York City and to the piers from which shipments were made by water to New England.

Only one yard, and that of small capacity, was located in the anthracite region itself. To this type of storage belongs also the great system of docks at the head of Lakes Superior and Michigan, designed to accommodate both anthracite and bituminous coal, which constitutes probably the greatest storage plant for coal in the world. The docks are necessary because navigation on the Lakes must be completed between April 15 and Dec. 10, and they exercise a beneficial influence on working time in the fields of the

northern and middle Appalachians, which supply the Lake trade. To whatever extent similar storage facilities can be constructed elsewhere, the working time in other districts will be equalized. Experience suggests, however, that such intermediate storage is feasible only at some natural breaking point. To halt the loaded train half way to its destination, store the coal, and later reload and transport it the remainder of the journey would be so expensive that the stored coal could not compete with that sent by through-shipment.

The real objection to intermediate storage as a solution of the problem of irregular operation is that it does not guarantee a steady supply to the consumer because the last link in the chain of transportation may fail at the critical moment. Thus, storage yards for bituminous coal in the vicinity of New York would have availed little to supply New England during recent periods of shortage, for the congestion in traffic through the gateways over the Hudson has on many occasions been the limiting factor in supplying New England. Not the least of the benefits of storage is the security it confers upon the consumer, and that security is not his until the coal is actually in his bin.

Storage at Place of Use Safeguards Consumer

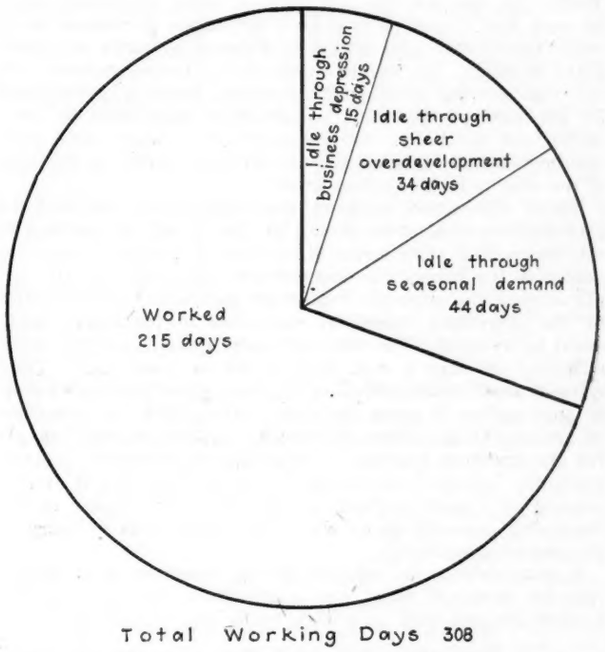
Storage at Point of Consumption.—The true remedy for the seasonal fluctuation in the demand for coal, therefore, is storage at the place of use, which will insure the consumer against the menace of interruption to his line of communication with the mine. The magnitude of the task of storing enough coal to equalize the demand is not so great as might at first be supposed. We already habitually accumulate a considerable stock against winter requirements. If in addition to the present normal stock, 20,000,000 tons can be put in storage between March 1 and Aug. 1, the task is done.

It is urged that the expense of constructing new storage facilities would be prohibitive. The experience of the war indicates that the additional facilities required can somehow be found, for on the day the armistice was signed the total quantity of bituminous coal in commercial storage was at least 63,000,000 tons, and it is improbable that the normal stocks on Nov. 11 exceed 40,000,000 tons. Where the extra 23,000,000 tons was accommodated is something of a mystery to the coal fraternity. Clearly much of it was in emergency stock piles inadequately protected and inconveniently placed. The fact that it was accommodated somehow indicates, however, that the task of storing enough coal to equalize the demand is by no means an impossible one. What was accomplished once by the consumer can be accomplished again, provided only that storage is made attractive to him.

Summer Discount Helps Anthracite Industry

Summer Discount in Prices.—To interest the consumer some inducement in dollars and cents must be offered which will counterbalance the cost of storage. The most successful inducement in actual practice has been the summer discount in the price of anthracite, which was introduced by the railroad companies in the anthracite region in the year 1900. The maximum discount offered amounted to 50c. a ton in the month of April, and was progressively reduced as the season advanced. It was some years after the summer discount was first offered before the working time in the anthracite region showed marked improvement, but since about 1910 the number of days lost per year has notably decreased, and the summer discount has no doubt contributed to that improvement. Some of the leading producers in Oklahoma and Arkansas have followed the same practice for years with beneficial results. Summer discounts on gas and domestic coal also were made by the Rhenish Westphalian Coal Syndicate of Germany. It should be noted, however, that summer differentials in mine prices are practicable only where competition is limited. If applied generally to sales of steam coal in the United States, the practice would involve the use of methods which probably would be construed to violate the anti-trust laws.

Sliding Wage Scale.—One means of making seasonal differences in mine prices possible is a sliding wage scale that varies with the season. The sliding scale that was introduced into the anthracite region in 1902 by direction of the Anthracite Coal Commission was not designed primarily to assist summer discounts in price, but it did in fact facilitate them. Under this scale the wage rate was increased 1 per cent for every increase of 5c. a ton in the price of anthracite at New York Harbor, and decreased as the New York price declined, except that at no time was the wage rate to fall below a prescribed minimum. The sliding wage scale was abandoned by agreement in 1912, but during the decade it was in force it no doubt assisted in maintaining the summer discounts in prices.


Idle through business depression 15 days
Idle through sheer overdevelopment 34 days
Idle through seasonal demand 44 days
Worked 215 days
Total Working Days 308

HOW AMERICAN SOFT COAL MINES HAVE SPENT THE WORKING YEAR—AVERAGE FOR THE PAST THREE DECADES

The records of the U. S. Geological Survey show that in the thirty years 1890 to 1919 the bituminous mines worked on the average only 215 days, and lost 93 possible working days each year. The diagram analyzes the general causes of this lost time; the apportionment between the several causes is estimated from all available data. The losses due to seasonal demand and overdevelopment probably are fairly regular. Those due to business depressions are present in some years and absent in others, the average for the 30-year period being about 15 days.

As the mine laborers will benefit more than anyone else by a stabilization of working time it seems not unreasonable that part of the burden of that stabilization should be borne by them. Such a sliding scale would presuppose premiums during winter as well as reductions in spring and summer. The sliding wage scale has the further advantage that it could be adopted, provided both parties were agreed, by making it a feature of the wage contracts between the unions and the operators. This course would avoid violations of the anti-trust laws and would offer a means of regulating the seasonal demand that could be put into operation by the industry itself without legislation.

Seasonal Freight Rate.—The most promising measure to induce summer storage by the consumer which has so far been proposed in the United States is the establishment of seasonal freight rates on coal. The bill introduced into Congress by Senator Frelinghuysen, of New Jersey, provided for graduated reductions in freight rates from February to July, and graduated increases from August to January. The maximum spread between the highest and lowest months was 50c. a ton. It was to be expected that the universal application of any change in coal freight rates would disturb established competitive relations between different fields and different types of coal, and this, it was shown, would be the probable effect of the Frelinghuysen plan.

No one set of differentials can be devised which will fit the business of all districts, for though in most fields there is a seasonal demand, the type curves of demand in the Appalachian region differ noticeably from those of the

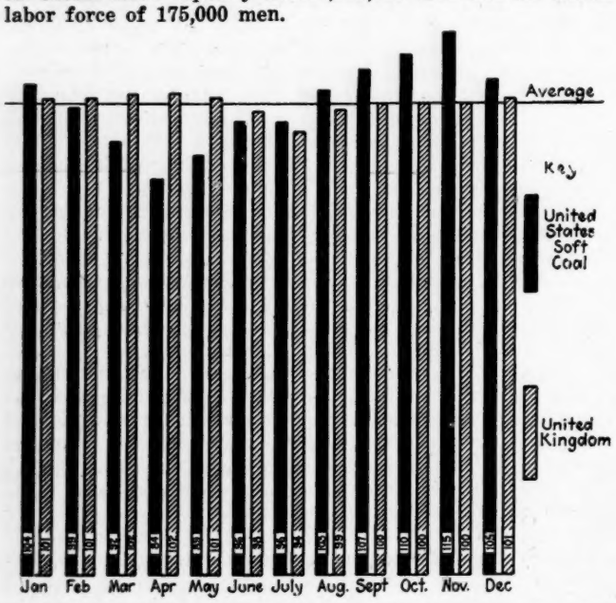
West. As drafted, the bill did not affect intrastate rates on coal, and it was pointed out that unless intrastate rates were swung into line with the differential rates on interstate business, the result would be confusion indeed. As the coal moving in strictly intrastate business constitutes 37 per cent of the total, exclusive of shipments to tidewater and the Lakes, the necessity of working out a harmonious set of differentials on all coal traffic is obvious, if the idea is to be applied at all.

These difficulties suggest that legislation intended to establish seasonal rates should be drawn only in the broadest terms and that large discretionary powers should be vested in the Interstate Commerce Commission. If the application of the principle were made sufficiently elastic many of the objections raised by operators in particular fields could be avoided. The differentials proposed probably were sufficient to offer a real inducement to store coal. They were at least much in excess of the normal seasonal swing in spot prices in most districts. Altogether the principle of seasonal rates, when judiciously applied, appears to offer the greatest promise of affecting the seasonal demand for coal. Its chief advantage lies in the fact that it can be applied by statute without any fundamental change in the régime of competition to which the bituminous industry is at present committed.

A counter-proposal offered by the operators as a substitute for seasonal rates was a drawback or rebate on the freight charges paid on coal actually put in storage.

Deflating "Watered" Mine Capacity

It will be noted that most of the foregoing devices are designed to overcome the seasonal demand. If successful, their net effect would be to distribute the total annual output in twelve equal monthly installments. This result, desirable as it is from many points of view, would not of itself remove the present discrepancy between annual capacity and annual requirements. If an even distribution of demand could be effected at once it would increase the number of days worked in April only to decrease them in November, and the total number of days worked in the year would remain just the same. We should still have an excess mine capacity of 250,000,000 tons and an excess labor force of 175,000 men.



SEASONAL FLUCTUATION IN OUTPUT AT BRITISH AND AMERICAN MINES

Columns represent the rate of output for the month, expressed in terms of per cent of the average rate for the year. Year chosen is 1913, the latest normal year for England. From the even height of the shaded columns it will be seen that in England—next to the United States the greatest producer of coal—the seasonal depression in output has been practically overcome. One factor in this result is the export trade of Britain, a considerable part of which is with the Southern Hemisphere. It is also true, however, that British consumers have adjusted themselves to a routine of steady purchasing, and this in spite of the fact that coal for household use is a larger element in the British internal demand than it is in the internal bituminous market of the United States.

The annual working time can be raised only by deflating the "watered" mine capacity—the overdevelopment and overmanning of the mines. To what extent the evening up of demand would contribute to this deflation is problematical. It ought to minimize fluctuations in mine price and therefore remove the periodic high spot prices, which have heretofore been one of the chief incentives to overdevelopment. Among its results should be fewer new mines and slower development of old mines. Its effect could at best be but gradual and negative, and a single return of a period of scarcity with its orgy of high prices, such as we experienced in 1920, would undo the work of years.

Necessary to Curb Unlimited Competition

The truth is that the remedies so far proposed do not touch the fundamental fact of unlimited competition. They provide no positive way to check the growth of mine capacity. So long as there is no limit to the opening of new mines, our enormous reserves and our guarantee that a new property shall get its share of the available transportation constitute a standing invitation to new enterprises, an invitation that needs only a tempting rise in the price of coal to find ready acceptance. There will remain also the pressure to open new mines in order to meet payments on investments in coal lands and the pressure to increase output in order to lower unit costs.

The necessity of some check on new development is shown by both of the two notable experiments in the stabilization of coal mining afforded by the history of the coal-mining industry. The anthracite operators of Pennsylvania, by means of summer discount and storage, did succeed in eliminating seasonal fluctuations in production. At the same time, however, the small underground reserves of anthracite had set a natural limit beyond which development could not well proceed. The retardation of development enabled production—now equalized throughout the year—to overtake mine capacity. In 1918 the anthracite region averaged 293 working days, or almost theoretically full time. Even in 1919, a decidedly abnormal year, the working time was 266 days.

In like manner the essential object of the German coal syndicate of Essen was to limit competition and so avert overdevelopment and overproduction. The conditions leading to the formation of the syndicate—rapid development, overproduction, irregular demand and sharp fluctuations in price—remind one strongly of the conditions in many coal fields of the United States today.

Unification of Interest to Check Overdevelopment

How far the industry itself can go in checking overdevelopment, in view of our present anti-trust laws, is a question. During the crowded four years from 1916 to 1920 forces have been at work which tend to a unification of policy and of interest. We hear of consolidations of strong companies within the same field; of acquisition by prosperous concerns in one field of properties in rival fields; of heavy investments in captive mines by industrial consumers and railroads. We have seen an increase in the number of operators' associations and in the work done by them, which culminated in the formation of the National Coal Association in 1917. The experience which the operators obtained during the war compelled them to get together and to adopt, for the time being at least, a national viewpoint. Not the least potent influence toward unification has been the prosperity attained during the war, which lifted the industry from a condition of near-insolvency and set it on its feet. This prosperity alone has provided a larger working capital and made possible the purchase of machines, improvements in mining practice, and a general improvement in technical efficiency.

But while these forces have been tending toward unified operation, a set of opposing forces has been at work in the other direction. The high prices and attractive profits and the magnitude of the war-time demand have resulted in an extraordinary enlargement of mine capacity. It is a question which of the opposing forces has made the greater headway. One fact is fairly clear: The tendency to combine has not gone far enough to squeeze out the water. The discrepancy between capacity and demand probably is greater now than it was in August, 1914.

The Weather Vane of Industry

News Notes Chronicling the Trend of Industrial Activities on Which Depends the Immediate and Future Market for Coal

LIQUIDATION has proceeded very far, and although stability has not yet been established to the level of commodity prices, we have approached a stable equilibrium that will encourage a renewal of trade on the part of those who rebelled against the prices of last year and instituted the buyers' strike, according to the July bulletin of business conditions issued by the Mechanics & Metals National Bank of the City of New York. "The adjustment of prices to a scale means much," the bulletin continues, "particularly with reference to the railroads and the agricultural interests. These interests found themselves hitherto in a very unsatisfactory situation, the worst feature of which was the fact that while the prices they received for their sales were low, the prices they paid for their purchases were so high as actually to forbid liberal buying. The railroads are the greatest employers of labor and purchasers of material in the country; the farmers as a class purchase more manufactured products than any other class of workers. But railroads and farmers must have a margin of income over expenses if they are to buy, and that margin can only come out of a proper equalization of prices.

"Although it sounds like a paradox, in view of the existing depression, business is in a far healthier state than it was at this time a year ago, when merchants were buying for the automatic rise in values which came while their goods lay on the shelves. Lax business methods have largely disappeared; that kind of speculative buying is definitely ended and merchants are seeing to it that purchases are closely adjusted to demand. Fundamental business is the keynote today, with emphasis placed on careful planning and turnover, hard work, service and salesmanship. The public having turned toward useful necessities, a considerable part of the boom material which was produced simply to make sales is no longer being turned out.

"With lower commodity prices, the price of labor is becoming more normal. Railroad wages have been cut down, and steel workers are facing adjustments, which, if carried through without difficulty, will have an excellent effect. There is an insistent call upon the railroads to bring down their charges in line with reductions elsewhere. It is maintained that the relatively low prices now prevailing for commodities make the cost of transportation so much more burdensome to producers than when prices were high and when transportation charges could readily be passed along to the consumers."

Mullins Body Co. Strike Ends

It has been officially announced that the strike of employees at the plants of the Mullins Body Co. at Salem, Ohio, makers of automobile bodies, has been ended, the workmen returning to the plants on the company's terms. The strike was in force for about two weeks.

Lackawanna Cuts Force 12 Per Cent

The Delaware, Lackawanna & Western R.R. announced July 7 a 12 per cent reduction in working forces at its Scranton repair shops, effective Monday, July 11. It also announced the placing of the shops on a 44-hour week basis. The order, it was said, would affect all other shops of the railroad.

Five Mills Close; 4,500 Idle

Four plants of the Greenfield Tap Die Corporation, which employs about 3,000, and the Goodell-Pratt Co. plant, employing 1,500 closed June 30 until Aug. 1. The two concerns are the principal industries of Greenfield, Mass.

Fewer Idle Freight Cars

The number of idle freight cars continues to decline, according to figures given out by the American Railway Association. These showed that there were 377,850 cars in excess of current freight requirements on June 23, or a reduction of 3,896 cars compared with the total on June 15. Surplus box cars, numbering 140,627, showed a decrease of 3,308 in approximately a week, and surplus coal cars numbered 163,982, an increase of approximately 4,500 over that reported for June 15.

B. & O. Mechanics Back at Work

Between 1,500 and 1,600 mechanics returned to work at the Mount Clare shops of the Baltimore & Ohio R.R. July 5 after a furlough of three weeks. The Mount Clare plant now is employing, roughly, two-thirds of the normal force of about 3,000, it was estimated at the company's offices. Including those at Mount Clare 3,600 shop employees returned to work, the others going back to shops at Cumberland, Md., where 450 were put on; Keyser, W. Va., and Glenwood, Pa.

Unemployment Increased in June

A decrease in employment of 2.9 per cent in the country during June as compared with May is indicated by a survey made by the Department of Labor of reports from 1,428 firms employing normally 1,600,000 persons. The decrease since January in these establishments, situated in sixty-five principal industrial centers, according to a statement issued July 7, has been 6.2 per cent. All industries reported decreased employment except food products, textiles, leather, liquors and beverages, stone, clay, glass and tobacco.

2,000 D. & H. Shopmen Return

About 2,000 shop employees of the Delaware & Hudson R.R. in New York State and Pennsylvania went back to work July 5, when several shops of the company were reopened after having been closed for six weeks. Officials of the road said that work was resumed on that date at Colonie and Oneonta, N. Y., and Carbondale, Pa. They estimated there were 1,500 men at work in the Colonie shops, 250 at Oneonta and 250 at Carbondale.

N. Y. Navy Yard Makes More Cuts

It is reported at the New York Navy Yard that 2,300 more workers are to be discharged by the end of this month. One thousand were to have been discharged by Saturday, July 9, and the rest are to be dispensed with when work has been completed on the Brazilian battleship Minas Geraes.

Hold Hearing on Readjustment of Coal Rates to Syracuse; Decision Awaited

APPLICATION having been made to the Interstate Commerce Commission by the coal railroads running into Syracuse and covering that territory generally, for what was called a readjustment of freight rates, a hearing was held in that city on June 27 and 28 by Manual Garcia de Quevede, examiner of the commission, and a large amount of testimony taken for future consideration and guidance in arriving at a decision.

The railroads concerned are the Lackawanna, which proposes to advance its rate 28c. to the Syracuse territory, and the New York Central and the Lehigh Valley, the latter reaching Syracuse over the Central, which propose to reduce their rates 14c. a ton. As the Lackawanna is the chief coal carrier, handling a great part of the anthracite used in the district, the consumers were especially concerned in opposing the changes. A leading part in the opposition was taken by the Syracuse Chamber of Commerce. The roads were liberally represented by attorneys. Some, who are acquainted with the situation, are of the opinion that the retail dealers did not feel like making a very determined opposition to the advance, as the Lackawanna road has been considering the plan of erecting its own local coal plants in Syracuse and if too much antagonized by the trade it might be provoked to do so.

Dr. Zimmerman Reports on Marketability of Beneficiated North Dakota Lignite

DR. ERICH W. ZIMMERMAN, consulting economist of the U. S. Bureau of Mines, has submitted to Director H. Foster Bain a preliminary report on the marketability of beneficiated North Dakota lignite. The report analyzes the conditions surrounding and the difficulties affecting the fuel supply of North Dakota, South Dakota and contiguous territory. The ultimate purpose of this study is to provide the necessary economic data upon which an estimate of the commercial possibilities of beneficiated North Dakota lignite may be built up. The report specifically deals with production and consumption in the territory mentioned, Northwestern fuel prices, Northwestern fuel imports with special reference to their sources, the Lake coal trade to the Northwest and the railroads and the Northwestern fuel supply.

Union Colonizes the Mingo Tent Colonies

HARRY OLMSTED, chairman of the Labor Committee of the Operators' Association in the Williamson field, makes the following statement: "Law-enforcement officers at Williamson are aware that recruits for the forces of the strikers have arrived recently into the hills of Mingo County. The idea of marching organized miners into the Mingo field from the Kanawha region was abandoned, but many of the men from that district have arrived in groups either by train or in automobiles.

"It is the opinion of the operators that these recruits are coming for another purpose than that of reopening the warfare in the Williamson district. They believe that the miners' organization wishes to make an impressive showing in numbers when the Senate committee arrives.

"As evidence of the recruiting process, Major Davis, who is in charge of the district under Governor Morgan's proclamation of martial law, recently detained forty men living in the Lick Creek tent colony of strikers. His examination of these men showed that fifteen of them were not residents of Mingo County, and had not worked a single day in the coal mines of the Williamson field."

Coal Mine a Feature of Mining Congress

A MODEL coal mine built under the supervision of government experts and illustrating the latest form of labor-saving mining machinery will be an interesting feature of the National Exposition of Mines and Mining Equipment which the American Mining Congress is preparing for its twenty-fourth annual convention to be held in Chicago, Oct. 17-22. From cutting machines to ventilating fans every form of modern coal-mining machine will be seen operating under actual working conditions.

When the Coliseum at Chicago opens its doors on Oct. 17 the visitor will have an opportunity of seeing an excellent facsimile of a coal mine and of exploring its recesses. He will come to an open shaft, enter a cage and descend to the bottom. Further on he will enter a chamber where he can observe the cutting machines and loaders at work. An electric locomotive will pull the cars to the conveyor, which will lift the coal to the mouth of the mine.

Western Kentucky Towns and Coal Mines to Get Power and Light from Utilities Co.

THROUGH a deal just closed whereby the Kentucky Utilities Co. takes over under a ten-year contract the power plants of the two largest western Kentucky coal companies, the St. Bernard Coal Mining Co., at Earlington, and the W. G. Duncan Coal Co., at Greenville, arrangements are being made to supply power to a large number of towns and coal companies which have neither light nor power at the present time. It is planned to string 150 miles of transmission, which will cost around a half million dollars and require probably a year to install, according to L. B. Herrington, vice-president of the utilities company.

It is reported that there is 5,000 hp. available, produced in the two plants, which have coal in good producing mines at hand. It is planned to distribute power through large generating plants at these mines and furnish power to Central City, Madisonville, Providence, Clay, Sturgis, Dawson, Greenville, Princeton, Morganfield and Uniontown. This is the largest power contract ever made in western Kentucky and the first looking toward hooking up a number of coal operations. It will result in a saving in the transportation of coal and materially aid in improving mine operation.

Big Explosion Wrecks German Mine, Killing Eighty-Three Men Out of Hundreds

A DOUBLE explosion that knocked men down a half mile away occurred in the Mont Cenis mine near Herne in Westphalia, Germany, on Sunday, June 19, killing 83 men out of hundreds who were working in the mine at the time. A number of men were still entombed on June 21, among them Herr Roechling, a son of the owner, who was engaged in the mine when the explosions occurred. One hundred persons were injured. Methane is said to have been the cause of the disaster and to have hindered the rescuers.

Tidewater Coal Exchange Issues Supplement No. 3 to Mine Classification No. 1

THE Tidewater Coal Exchange, Inc., issued as of June 22, Supplement No. 3 to Classification of Mines No. 1. This supplement will be mailed to each yearly subscriber. Copies of Classification No. 1 and Supplement No. 3 are available also to the coal-purchasing public and all interested parties and will be mailed on receipt of 25c. and extra copies of Supplement No. 3 will be mailed on receipts of 10c. For $1 monthly supplements will be regularly supplied, containing all changes, additions and eliminations.

Try to Mine Coal Before Law Can Act

CLAIMS are made that the Glen Alden Coal Co. is triple-shifting its operations in the surface beds at the Archbald, Sloan and Hyde Park collieries so as to obtain as much coal as possible from them before the new laws come into effect on Aug. 27, when it will be impossible to mine the upper beds without violating the Kohler law or accepting the Fowler law provisions. The lower measures may be worked with less prospect of injury to the surface. The Se-Rob Coal Co., with mines in West Scranton, also is running two shifts, though formerly it worked only one.

Effect Upon America's Foreign Trade of Improved Production of Manufactured Goods in Europe*

By Herbert Hoover

THERE is a feeling of some uneasiness and even of pessimism regarding the future or our foreign trade, in which I do not participate. The importance of our foreign trade requires but little defense. I may say in passing that our whole standard of living greatly depends upon our imports and that our exports are the great balance wheel for our production. Exports are vital to the stabilization of our industries, of price levels, of wages and of employment.

While our exports do cover but a small percentage of our total production, on the other hand they do comprise a large percentage of the production of certain industries. For instance, we generally export 20 per cent of our wheat, 60 per cent of our cotton, 75 per cent of our copper, not to mention others. Unless we find a market for the surplus production of our great industries, we shall continue to keep some twenty-five millions of our people in reduced buying power. We might even drive them into poverty—during the many years that would be required to shift the whole basis of our internal production. Nor does a nation become rich by its exports alone, but by its trade.

While many of the causes of the present depression lie within our own borders, yet there may be no recovery from these hard times for many years to come if we neglect our economic relations abroad. Even if we lower our vision of civilization in this crisis solely to our own selfish economic interest, we are yet mightily concerned in the recuperation of the entire world. The hard times that knock at very cottage door today came from Europe. No tariffs, no embargoes, no navies, no armies can ever defend us from these invasions. Our sole defense is the prosperity of our neighbors and our own commercial skill. The recovery of our foreign trade can march only in company with the welfare and prosperity of our customers.

When we analyze the present foreign trade situation, we find tremendous shifts in economic currents since 1914. Indeed, we find great changes still in progress. If we would guide our policies of production and of trade aright we must keep these great changes constantly in mind. These profound alterations naturally fall into two divisions: The shift in the world's production and markets and the shift in the world's financial relations. They bear upon each other, and they affect our three primary groups of food, raw material and manufactured goods differently.

World Changes in Production and Markets

The United States.—There have been great changes in our own economic situation. We have not alone shifted from a debtor to a creditor nation. Our capacity for surplus production in food and manufactures has grown enormously during the war until we have taken front rank of the world in foreign trade. The direction of our trade has shifted greatly. During the last year about one-half of our whole foreign trade was with Europe, but of our exports to them 80 per cent were foodstuffs and raw material; of our exports to states outside of Europe about 75 per cent were manufactured goods. Europe in turn is our serious competitor in marketing our manufactured goods to the rest of the world. We have enormously increased our imports of tropical and other commodities that we do not produce.

The Noncombatant Countries.—Since the great war began the world outside the fighting states of Europe has gained mightily in wealth, in standards of living, and in consuming power. Even omitting the United States, it has gained something like forty millions in population. The countries not directly affected by the war are indeed suffering from the general depression, but this depression with them is only the aftermath of the malevolent forces born of the past war booms. They have none of the deep economic wounds of the fighting states, and they will be quick to recover. During the war the productive capacity of these states, except possibly Japan, had no unusual increase because of their isolation through shortage of shipping.

Russia.—One of the economic shifts that affects the whole world profoundly is from Russia. Russia bore much the same relation to western Europe before the war that the Mississippi Valley bears to our Northeastern States. Russia was one of the great food bases of the manufacturing countries of western Europe, exchanging food for their fabricated products. These manufactured goods in turn were to some degree produced from our raw materials. Even at best it will be many years before Russia will have recovered. We are today the only great source of enlarged food production. Europe must and will draw from us a great proportion of food supplies that she formerly drew from Russia. I see no basic reason why we should not continue to export approximately the same large volume of foodstuffs that we have shipped abroad during the past twelve months. This item alone at even present prices would be triple our pre-war food exports, and would represent the equal of more than 60 per cent of our whole pre-war export trade.

German Reparation Certain to Have Profound Effect

Germany.—Another great but uncertain shift in world forces will arise out of Germany. The reparation payments must have a profound effect upon the whole economy of the world. Germany is to pay outside her borders to the Allies $500,000,000, plus 26 per cent export duty, or, say, a minimum of about $750,000,000 per annum. Germany is left without much gold foreign property or foreign business earnings of consequence; therefore these payments must be made mostly by the sale of manufactured goods outside her borders. But beyond the reparation payments, she must also sell goods abroad in the amounts necessary to buy her imports of food and raw materials.

Any calculation based on the pre-war trade of Germany implies an enormous increase—perhaps more than doubling—of her pre-war exports. In view of the export duty and other payments, she must produce these goods for about one-half our production cost in order to take our markets. Such an increase in exports must be manufactured goods, and until the world consumption grows, these must be marketed in displacement of the goods of other industrial nations. We shall certainly feel the effects of this flow of goods that must be produced if she is to make reparation payments. On the other hand, Germany must take more raw materials from us for this purpose. In any event, the crowding in the market of German exports will affect her immediate neighbors more than ourselves, for 80 per cent of her market, pre-war as well as in the future, must lie in Europe itself.

Effect Upon Us of Improved European Production

Any improvement in European production of manufactured goods will favorably affect our market for those raw materials, such as cotton and copper, where we possess the final supplies. In considering the demands for such raw materials we must remember that the manufacturing countries of western Europe have lost for a long time to come any great markets in Russia and Turkey; the population of Europe as a whole has not the consuming capacity for manufactured goods that it had before the war and, therefore, we must expect a less than pre-war consumption in the confines of Europe for their remanufacture of our raw materials. But on the other hand, they will find after this depression is passed that the markets of the rest of the world are larger than before the war. I am confident they will

*Abstract of an address before the National Shoe and Leather Exposition and Style Show (Inc.) Boston, Mass., July 12, 1921.

gradually return to pre-war demand for our cotton, copper, etc. Fortunately, our producers have realized this temporary situation and have vigorously reduced their production so that they should eventually realize better prices than at present.

As to our manufactures containing a large element of labor cost, in which we do not enjoy special advantages, we must look out and take measures of our own. We can no doubt devise tariff measures that will protect our domestic market, but if we are to hold to our foreign markets in this vast group of our manufactures, and thus to keep our people employed, we have several things to attend to. Fundamentally, we must get our production costs down. That lies only along the road of increased efficiency in our whole industrial machine. It means a willingness of our working people to put forth every effort that is in them consistent with health, proper family life and good citizenship. The surest road to a continued high wage and the surest safeguard against unemployment is to remove every restriction on effort. I am confident we can hold our markets, our higher standards of living and of wage if we will all put our backs into it.

Shift in Credits Overshadows Other Problems

Overriding all these questions of production and markets is one of credits. Our whole financial relation to the rest of the world has greatly shifted. From a nation owing some five billions of dollars to the rest of the world for moneys borrowed, the war has reversed our position so that the world, principally Europe, owes us today from thirteen to fifteen billions of dollars, of which about ten billions is due our government. Before the war we had to export a surplus over our imports, and beyond this had to contribute through remittances of immigrants, tourists, shipping, etc., great sums to pay interest upon our debts.

The reason for the piling up of this vast debt is, of course, that we have not only loaned money to the Allies but have also since the war vastly increased the surplus of our exports, and the movement still continues to accumulate in our favor. Unless we would cease a large part of our war increased productivity with all the resulting unemployment and losses of such a cessation, we must continue for some time to export in excess of our imports. I may repeat that if today we stop giving more credits and demand payment of interest on debts due our government, our exports will further decline, and the decline will find its interpretation in more unemployment among our own people and more displacement of our industries.

Dollar at Premium All Over the World

The natural effect of our continued surplus of exports (although we have as yet made no demand for payment of interest on the government debt) is that our dollar is at a premium over even the most stable currencies in the world. Thus the cost of producing our commodities is higher than in any other country. This does not so materially affect the export of those commodities of which we hold a final supply, such as the food supplies and our raw materials, or those articles in the manufacture of which we have unique ability. It does, however, partly blockade our exports of manufactured goods in which we directly compete with Europe. Exchange itself is not the cause but the effect. It bears the same relation to trade that the barometer does to the weather. It is but an indication of the movement of commodities and credit. Our higher barometer means we need more credits outward or as an alternative we must send less goods out or take more goods in.

Attempts to bring exchange to parity or to create international securities of any kind are open to the objection that they involve an element of inflation and that they practically open the gates of credit from the United States without regard to risk, how its purpose affects us or whether it really benefits the borrower. Loans from our government direct to foreign governments or foreign merchants have a hundred objections and disagreeable entanglements which we learned well enough during the war. In all this maze of difficulty and the unsettlement over credits and debts I would sum up that wisdom consists in knowing what to do next rather than debates upon perfection.

I believe all trading states of consequence in the world can even now finance their imports of food supplies. The stronger of them can finance their imports of raw materials. We are, indeed, importing very much larger quantities of tropical produce than before the war and our own consumption of these commodities will continue to grow. The margin of credits needed beyond our imports in order to keep commerce alive for the present are, first, comparatively short term amounts to cover part of our exports of raw materials and the distribution period of our manufactured goods and, second, constant refinance of debts or interest already owed to us.

In summary, on the production and marketing side of our commerce we can say that our food exports should remain on a greatly enlarged scale; that the demand for our raw materials should slowly increase toward pre-war amounts; that in respect to our manufactures we should be able to hold special fields or repetitive production and ingenuity; that we will need to make a fight to hold the markets for manufactured goods where we come more directly into competition with the European manufacturer, but that we can do it if we will work and apply our brains to it. On the financial side of our situation, I do not believe our world credit situation is at all so unsurmountable or that it requires extraordinary solutions.

I may repeat that we need to realize above all things that, even if we lower our vision of civilization in this crisis solely to that of our own selfish economic interest, we are mightily concerned in the recuperation of the entire world. There is an economic interdependence in the world that recognizes no national boundaries. The greatest jeopardy to the standard of living of our people is the lowered standards of Europe. Now that we have become a great debtor nation we must learn that this great debt must be wisely directed so that we do not stifle both our own growth and the growth of others.

We are not a nation of machines, and houses, factories and railways. We are a nation of men, women and children. Our industrial system and our commerce are simply implements for their comfort and happiness. When we deal with those great problems of business and economics we must be inspired by the knowledge that we are increasing and defending the standards of living of all our people. Upon this soil grow those moral and intellectual forces that make our nation great.

---

429 Coal Vessels Dock at Duluth-Superior Up to June 30; 162 Last Year

VESSELS arriving with coal at Duluth-Superior for the season up to June 30 totaled 429 as compared with 162 during the corresponding period last year.

Receipts of coal at the docks during June and for the season to June 30, compared with 1920, are as follows, in net tons:

	1920		1921	
	Anth.	Bit.	Antn.	Bit.
Northwestern	51,600	73,000	53,000	335,800
Berwind	.....	42,100	.....	209,800
Pittsburgh	43,700	85,100	45,800	401,500
Carnegie	15,800	33,600	8,700	216,900
Hanna	20,200	40,000	10,800	104,000
Reeves	.....	.....	6,600	5,800
Boston	8,300	.....	8,700	74,500
Inland	.....	23,900	.....	77,200
Clarkson	.....	23,500	12,000	118,800
Northern	17,270	7,100	.....	123,200
Zenith Furnace	.....	24,300	.....	47,500
Philadelphia & Reading	.....	22,300	30,000	60,000
U. S. Steel Corporation	.....	255,000	.....	188,400
Reis	17,500	24,400	11,500	106,700
Pursglove	.....	17,200	.....	39,900
Lehigh Valley	43,200	.....	.....	.....
Great Lakes	.....	11,100	7,800	45,200
June receipts	217,570	632,600	194,700	2,155,200
Total to June 1	174,500	276,400	261,900	1,633,200
Totals to June 30	392,070	959,000	456,600	3,788,400

Anthracite receipts in excess of last year, 64,530 tons.
Bituminous receipts in excess of last year, 2,829,400 tons.

Pause in Coal Legislation; Stabilization a Constant Menace; Regulation Believed to Be Inevitable

By Paul Wooton
Washington Correspondent

APPARENTLY there is to be an intermission in legislative activities pertaining to coal. It is becoming increasingly evident that Senator Frelinghuysen played his hand well when he put up the seasonal rate bill to be shot at by the Senate. By withholding the coal stabilization bill he now is able to keep the opponents of that measure on the qui vive continually. The bill is on the calendar with the ever-present possibility of its being called up unexpectedly, possibly when but few Senators are in the chamber. The more likely course, however, is that Senator Frelinghuysen will be content to allow the measure to remain on the calendar until sentiment in the Senate toward such legislation may undergo a change. Were there to be a repetition next autumn of the conditions which prevailed last year, it is recognized that there would be a chance to pass the bill.

It is generally admitted that had the Calder committee recommended legislation no more drastic than the Frelinghuysen bill, it could have been put through Congress at that time. Many Senators opposed to even as mild a form of regulation as is proposed in the Frelinghuysen bill are of the opinion that regulation for the coal industry is only a matter of time. The time may be greatly extended, they believe, if everything runs smoothly in the production and distribution of coal. At any rate, it is evident that the public is not going to insist upon punishment for the coal trade for what happened in 1920.

In a way, the coal industry has a new lease on unregulated life, but the length of the lease will depend almost entirely upon what happens—regardless of whether or not coal producers or dealers are responsible. In that respect the coal industry apparently is to be favored by the absence this fall of a coal shortage. Information reaching Washington, both through government and private sources, is to the effect that stocks are being well maintained. Current needs apparently are being abundantly cared for by the present rate of production, with little prospect that demand will increase at any time during the coming autumn or winter beyond the point where adequate distribution is assured. In that connection it may be started that the hope for increased buying of coal is based at this time more largely on export than on increased activities on the part of American industries.

Minnesota Property Owners Launch Propaganda for Government Coal Control

THE "Property Owners' Federation, Inc.," with headquarters in Red Wing, Minn., is now conducting a mail propagnda in the interests of coal nationalization. While its professed idea is to bring about "government regulation of production, distribution and sale of coal, not for government ownership of mines," it is obvious what such a program would lead to.

Circulars sent out by this organization bear the fac simile signature of "K. Neuston, secretary." The reading matter asks for a constitutional amendment, if needed, to enable the government to control coal distribution, and points to the records of state fuel administrators during the war as a source of valuable information. It says that the same sort of control is desired for coal as is being applied to railroads and grain markets. "Five efficient and reliable leaders" in Washington who are listed as men who will listen to a public appeal are named—President Harding, Secretaries Hoover and Fall, and Senators Calder and Frelinghuysen.

Recipients of the circulars are asked to send the names of substantial business acquaintances anywhere in the United States. The Federation engages to send in return "letters of one terse sentence urging prompt action" which the recipient is to sign and mail. The Federation also says it will mail at the same time "a wide-range array of facts and data from which you can form your high pressure personal letters to the officials at Washington, whom we have just mentioned." It is requested that $5 accompany each list mailed to the headquarters. What this money will be used for is not definitely stated, save that it "will finance this issue to a successful finish."

Some of the Neuston circulars have already reached the anthracite region. Traces of this activity have been found in New Jersey and elsewhere. It is a propaganda which, if it is at all successful, probably could be combated best by means of protests from business organizations and individual citizens, addressed to proper persons in Washington. The general tenor of the circular, and of the propaganda for that matter, according to a report from Philadelphia, is strongly reminiscent of the extra-official activities of a former fuel administrator in the Northwest, who never allowed the facts to disconcert him when he placed his fuel theories before the public.

Attorney General Grants Hearings to Indicted Operators and Miners

IN compliance with a request of the Committee on Judiciary of the House of Representatives Attorney General Daugherty gave a hearing July 5 to representatives of coal-mine owners indicted for alleged conspiracy in connection with the coal miners' strike last year. The following day the Attorney General gave a hearing, at the request of Samuel Gompers, president of the American Federation of Labor, to representatives of the mine workers who were indicted.

The House also asked Mr. Daugherty to render an opinion on the constitutionality of a bill introduced in the Senate by Senator Nelson, chairman of the Judiciary Committee, which was passed by the Senate and is now before the House Committee on Judiciary. Under the terms of the bill a person or corporation indicted under the Federal statutes could be denied a preliminary hearing in the place of his or its domicile and tried in a Federal court situated where they reside or have their place of business. Both operators and miners contend that the bill is unconstitutional in that it denies them the right to a preliminary hearing and trial in the place of their domicile. The purpose of the legislation is to enable the government to try the cases in the U. S. Court at Indianapolis.

No. 1 District, United Mine Workers, will hold its nineteenth consecutive and fourth biennial convention at Wilkes-Barre on July 18 and succeeding days. All local unions between Mocanaqua and Forest City are included in the district. The meeting will be held in the Y. M. C. A. Building, North Main Street.

Bids Opened for Coal for New York Schools; Only Three Bids for Full Amount

PATRICK JONES, superintendent of school supplies of the Board of Education of New York City, opened bids on June 27 for the furnishing and delivering of more than 130,000 net tons of anthracite and bituminous coal for heating the schools and buildings of the Board during the year ending April 30, 1922. The bids received showed considerable variation. For furnishing and delivering the entire tonnage for the Borough of Manhattan there were three bidders. The bids received together with the various tonnages were as follows:

	W. Farrell & Son	C. D. Naughton & Co.	Inter-City Fuel Co.	Penn Fuel Co.
Broken, 15,000 tons	$12.39	$13.13	$13.89	
Egg, 1,000 tons	12.39	13.93	14.33	.....
Stove, 400 tons	12.39	13.93	14.33	.....
Pea, 2,000 tons	10.39	11.00	11.97	.....
Buckwheat No. 1, 10,000 tons	7.49	8.15	8.85	$7.95
Buckwheat No. 1,* 14,500 tons	7.49	8.15	8.85	7.95
Buckwheat No. 3,† 10,750 tons	5.49	6.42	7.56	5.74
Semi-Bituminous,† 3,750 tons	8.39	8.48	10.05	7.44
Semi-Bituminous 1,350 tons	8.39	8.48	9.55	7.94

Items marked †, if awarded, to be awarded in conjunction with each other. If item marked * is accepted, items marked † will not be awarded.

For delivering coal in District No. 3 the following bids were received:

	Stephens Fuel Co.	Inter-City Fuel Co.	Weber-Bunke-Lange Coal Co
Broken, 4,300 tons	$13.10	$13.94	$12.50
Egg, 200 tons	13.10	14.38	12.50
Stove, 100 tons	13.10	14.38	12.50
Pea, 1,100 tons	11.30	12.02	10.00
Buckwheat No. 1, 4,000 tons	8.34	8.90	7.50
Buckwheat No. 1, 5,500 tons	8.34	8.90	7.50
Buckwheat No. 3, 3,950 tons	6.50	7.61	.....
Semi-bituminous, 1,550 tons	8.50	10.10	.....

For furnishing and delivering the tonnage required in the in the Borough of the Bronx, the following bids were received:

	W. Farrell & Son	V. H. Youngman & Co.	Stephens Fuel Co.
Broken, 4,000 tons	$12.39	$13.23	$13.10
Egg, 500 tons	12.39	13.53	13.25
Stove, 400 tons	12.39	13.73	13.25
Pea, 500 tons	10.39	11.23	11.30
Buckwheat No. 1, 3,800 tons	7.49	8.48	8.34
Buckwheat No. 1, 8,600 tons	7.49	8.48	8.34
Buckwheat No. 3, 6,000 tons	5.49	6.96	6.50
Semi-Bituminous, 2,600 tons	8.39	8.96	8.50

For furnishing and delivering the following tonnages to the schools in Brooklyn, the bids received follow:

	Wyoming Valley Coal Co.	Bacon Coal Co.	Putnam Coal & Ice Co.
Broken, 18,000 tons	$12.24	$12.20	$13.20
Egg, 500 tons	12.24	12.20	13.20
Stove, 575 tons	12.24	12.45	13.50
Pea, 2,600 tons	9.74	10.52	10.71
Buckwheat No. 1, 12,400 tons	7.29	7.35	8.25
Buckwheat No. 1, 11,600 tons	7.29	7.35	8.25
Buckwheat No. 3, 8,500 tons	5.29	5.54	6.50
Semi-Bituminous, 3,100 tons	8.24	7.31	8.45
Semi-Bituminous, 700 tons	8.24	7.31	8.45

For furnishing and delivering the tonnage required in the Borough of Queens, the following bids were received:

	Wyoming Valley Coal Co.	Commonwealth Fuel Co.
Broken, 5,650 tons	$12.24	$12.63
Egg, 190 tons	12.24	12.63
Stove, 350 tons	12.24	12.98
Pea, 750 tons	9.74	10.24
Buck. No. 1, 3,500 tons	7.29	7.89
Buck. No. 1, 3,100 tons	7.29	7.89
Buck. No. 3, 2,300 tons	5.29	5.97
Semi-bituminous, 800 tons	8.24	8.44
Semi-bituminous, 235 tons	8.24	8.44

Another Connellsville Wage Reduction

ABOUT 7,000 mine and coke workers in those plants of the Connellsville region which are not operated by the United States Steel Corporation have received a further reduction in wage of 10 per cent, making the rate about 33⅓ per cent below the rate paid Jan. 1, but the wage is still some 45 per cent above the prevailing rate in 1912. Few cokemen are immediately affected, as only 7 per cent of the independent ovens are in operation. The H. C. Frick Coke Co. now has a scale, made May 16, which by this recent wage reduction is rendered somewhat higher than that of the independents. The change in the independent scale was made July 5.

The schedule as posted by W. F. Rainey, Inc., to take effect July 1, runs as follows:

Per Day:	
Drivers, motormen, brakemen, timbermen, bratticemen, etc.	$4.50
Helpers and inside labor	3.75
Fire bosses	6.25
Outside labor	3.00
Per 100 Bushels:	
Pick mining and loading in rooms and ribs	2.06
Pick mining and loading in headings	2.26
Pick mining and loading in wet headings	2.44
Loading machine-mined coal	1.48

The Washington Coal & Coke Co., at Washington Run, also made the same wage reduction as Rainey on July 1, and the American Coke Corporation, operating plants at Linn, Orient and Martin, followed suit on July 7. Both these companies are running their mines about full, but are not making coke. The Washington Coal & Coke Co. has about 1,000 ovens.

New Bill Taxes Coal Imports from Countries Levying Duty on American Coal

WHILE coal has been placed on the free list by the Committee on Ways and Means of the House of Representatives, the bill as reported to the House provides "that when any country, dependency, or other subdivision of government imposes a duty on such articles imported from the United States, an equal duty shall be imposed upon such articles coming into the United States from such country." The paragraph includes bituminous and anthracite coal, culm, slack, shale and coke, as well as "compositions used for fuel in which coal or coal dust is the component material of chief value, whether in briquets or other form."

The producers of coal in the State of Washington had asked for a duty of 75c. on all imports of coal. It would take that amount, it was said, to equalize producing costs. The action of the Ways and Means Committee will allow the collection of a duty of 53c. a ton so long as Canada continues its present duty on coal imported into that country.

The Committee on Ways and Means recommends a duty of 35c. per barrel on crude petroleum and 25c. per barrel on fuel oil. This action was taken at the last minute before the reporting of the bill. Both petroleum and fuel oil were on the free list on the bill given out in advance to the press.

New Jersey Seeks Cause of High Prices

SENATOR FRELINGHUYSEN'S passionate appeal for more information about the coal business may be gratified at last. At least, a legislative committee in his own State of New Jersey has determined to find out about "conditions responsible for the excessive cost of coal in New Jersey." Its inquiry was scheduled to begin in the City Hall, Jersey City, on Monday, July 11. Senator William B. Mackay, of Hackensack, is chairman of the committee.

Massachusetts Fuel Director Would Test Pennsylvania Anthracite Tax

EUGENE C. HULTMAN, State Fuel Administrator of Massachusetts, recommended July 1 that proceedings be brought by Attorney-General J. Weston Allen in behalf of the Commonwealth of Massachusetts to test the constitutionality of the Pennsylvania laws, now in effect, which impose taxes on coal mined in that state and intended for shipment elsewhere.

The taxes, the Fuel Administrator contends, would increase the cost to consumers in Massachusetts from 30c. to 40c. a ton. The Attorney-General was asked to consider also whether injunction proceedings might be brought to restrain enforcement of the laws.

Statistics the Means to an End, Not an End in Themselves

To Be Worth While, Facts Must Be Collected at First Hand — Bureau of Mines Reports Often Basis of Technical Inquiries

BY GEORGE OTIS SMITH*

AT BOTTOM, the issue becomes one of grammatical number: whether statistics *is* or *are? Is* statistics a separate branch of science, with a field peculiarly its own, or *are* statistics simply facts stated by means of figures?

The scientific bureau is a fact finder; if successful, it finds facts, it works out their interpretation, and it publishes the truth. Many of the facts thus gathered can be stated quantitatively as well as qualitatively—that is, numerals as well as words can be used in describing the results of the investigation. Tables of figures and graphic curves and diagrams may help to set forth the facts exactly, but whatever may be the form or the means of their presentation the facts are the things to be sought and found and published. To the government official who is seeking to give the public the results of scientific investigations made at public expense statistics *are* simply the means to an end, not an end in themselves.

So, then, we can dress up facts for public appearance in either words or numerals, or in both. The U. S. Geological Survey, for instance, gathers facts of many kinds and in many different fields. Each year our engineers determine the exact elevation or geographic position of a thousand or more points on the earth's surface; and statistics of this type are tabulated in books and are recorded on monuments, commonly called bench marks. Other engineers determine each year the amount of water flowing in our principal rivers and streams; figures are collected at 1,250 stations and tabulated in an annual series of statistical volumes. Another group of facts that are collected regularly relate to the monthly output of electric current by more than three-thousand public-utility power stations. Or the study that expresses its results in long tables of figures may be the work of the chemist and petrographer, as, for example, the monumental Professional Paper 99, with its 8,602 chemical analyses, a kind of world census of the igneous rocks.

MINERAL DATA OF SURVEY HAVE WORLDWIDE REPUTE

Statistics of another and better-known type, with which the Geological Survey has been busy for forty years, are the facts of mineral production in the United States—facts that have been collected annually by one group of men along a well-established line of precedents and policy. The mineral statistics of the U. S. Geological Survey are not only its best-known statistical product but they have a worldwide reputation, which puts them in a class by themselves as compared with similar statistics collected by the French, British, Belgian and German governments. What are the reasons for the difference?

To begin with, whether facts are to be expressed in numerals or in words, they are best collected at first hand. A field service is superior to an office force for gaining the personal touch which gives life even to statistics. The ideal collector of facts, moreover, is the field man who has known his subject for years, and that subject is not merely statistics but the reality behind the words and figures. The investigator who expresses some or all of his facts in tables of figures is not thereby put in a separate class. He is essentially an engineer, or a chemist, or a geologist—not necessarily a statistician. It is the special training of the fact collector in this or that science that makes him able to give the highest value to his facts, for while the way in which he presents his facts may bring out that value and add to their practical usefulness, neither words nor numerals can create that value.

Statistical inquiries considered as a whole usually have little in common except this word "statistics"; properly define that word or use some synonym, and the need of coordination disappears. Cotton and copper are leading items of export, and the facts as to production and stocks on hand of both are of large commercial value, yet crop reports and studies of ore reserves are best made under different auspices. Specialization yields the best results.

The issue of centralized statistics versus specialized service is likely to become the difference between a mechanical assembling of figures, without interpretation, by office compilers who know little of their subject at first hand, and a continued study in which numerical statements of facts are interpreted by specialists who have lived with their subjects for years. Statistics of themselves are only an adding-machine product, no more to be set up and worshiped than the verbal output of the typewriter, and to segregate the Federal adding machines would be no more rational than to assemble all the government typewriters. It is the man behind the adding machine and its operator who counts, and that man is likely to be a fact finder rather than a statistician.

MERE ADDING MACHINE STATISTICS OF LITTLE VALUE

Moreover, the environment of this fact-finding activity exerts a strong influence. If the tie that binds this investigation and that study is nothing more than the adding machine the whole product may be expected to show that it is machine-made. Specialization in a government bureau means the association of specialists working on allied subjects, under a supervision that is both well informed on the special subjects of inquiry and sympathetic with the aims of the workers. To revert to the illustration of cotton and copper, subjects of study so diverse are not easily combined. Even a super-statistician in a centralized bureau of statistics might know no more about cotton than the Director of the U. S. Geological Survey, nor as much about copper as a bureau chief in the Department of Agriculture.

Finally, the collection of facts and their publication in statistical form is not the end of the government activity on the subject. Just as the facts regarding cotton or copper take on commercial meaning, so they also form the starting point for scientific investigation in the specialized work of the bureaus or departments. The activity of the Geological Survey and the Bureau of Mines in their engineering work on coal and oil affords the best instance of a comprehensive program in which the collection of statistics of mineral production or mine accidents is only one part, though an important part, for these facts have from time to time been the point of departure for technical investigations. In the Department of the Interior the investigations that touch minerals have the threefold purpose of assuring supply, decreasing cost, and increasing value as measured by usefulness. In investigative effort of this type statistics are merely tools.

*Director, U. S. Geological Survey.

THE GEOLOGICAL SURVEY is preparing a summary of its April stock report. This is being done largely as a matter of record. The appropriations allowed the Survey for the next fiscal year are insufficient to permit of the gathering of any further reports on coal stocks.

THE ALABAMA STATE BOARD OF EXAMINERS will hold its next semi-annual session for the examination of applicants for certificates as first- and second-class mine foremen and fireboss, in the offices of Chief Mine Inspector C. H. Nesbitt, Chamber of Commerce Building, Birmingham, Ala., July 25-29 inclusive.

THE INTERSTATE COMMERCE COMMISSION has been advised by the Association of Railway Executives, the National Electric Light Association and the National Committee on Gas and Electric Service that they will aid in steps to accumulate as much coal as possible at this time while transportation is available.

THE DIRECTORS OF THE NATIONAL COAL ASSOCIATION planned to meet in Chicago July 13. The secretaries of the local associations and individual operators were invited to attend. Important reports were expected to be submitted by the government relations committee, the railroad relations committee and the committee on publicity.

Bituminous Output, January-April, 1921, by States, Estimated by Geological Survey

ESTIMATES of the production of bituminous coal by states during the first four months of the present year have been issued by the Geological Survey. As the estimates are based upon records of cars of coal loaded by the principal carriers, they are subject to material revision. When a railroad originates coal in more than one state its tonnage must be arbitrarily apportioned between the states in question. While therefore the estimates for the country as a whole are probably correct within 2 per cent, the estimates for individual states are subject to a much larger margin of error.

Making due allowance for probable revisions, it is instructive to compare the production attained during the first four months of the present year with that in earlier years. In the first column of the following table the output is shown by major groups of states. The second column shows what production for twelve months would amount to if the 4-month rate were continued. In the last three columns comparable data are given for the calendar years from 1918 to 1920.

It will be seen that production from January to April, 1921, was at only 70 per cent of the 1920 rate, and even only 85 per cent of the rate in 1919, a year of subnormal production.

PRODUCTION OF SOFT COAL, BY GROUPS OF STATES, 1918-1921
(In thousands of net tons)

	First Four Months of 1921	Year 1921 at Same Rate as 1st 4 Mos.	1920	1919	1918
Northeast *a*	74,813	224,439	331,510	288,250	351,365
Southern Appalachian *b*	5,828	17,484	23,500	20,420	26,083
Eastern Interior *c*	32,021	96,063	130,800	94,600	130,768
Western Interior *d*	6,652	19,956	29,930	22,590	30,724
Mountain States and Northwest *e*	9,726	29,178	40,680	32,090	40,341
Totals	129,040	387,120	556,420	457,950	579,281

(*a*) Michigan, Pennsylvania, Ohio, West Virginia, Maryland, Eastern Kentucky, and Virginia. (*b*) Alabama, Georgia, and Tennessee. (*c*) Illinois, Indiana, and Western Kentucky. (*d*) Iowa, Kansas, Missouri, Oklhoma, Arkansas, and Texas. (*e*) Colorado, New Mexico, Utah, Wyoming, Montana, North Dakota and Washington. (*f*) Alaska, California, Idaho, North Carolina, Oregon and South Dakota not included.

ESTIMATED PRODUCTION OF SOFT COAL, BY STATES, JANUARY TO APRIL, 1921
(In thousands of net tons)

	January	February	March	April	Year to April 30
Alabama	1,338	1,068	995	900	4301
Arkansas	157	119	120	111	507
Colorado	1,054	747	618	643	3,062
Illinois	7,074	5,313	5,100	4,580	22,067
Indiana	2,243	1,834	1,720	1,240	7,037
Iowa	610	506	489	417	2,022
Kansas	508	399	389	382	1,678
Kentucky	2,568	2,028	2,100	2,053	8,749
Maryland	231	228	207	189	855
Michigan	125	98	80	72	375
Missouri	433	310	320	287	1,350
Montana	279	283	274	211	1,047
New Mexico	262	203	204	197	866
North Dakota	56	54	53	35	198
Ohio	2,963	2,232	2,335	2,098	9,628
Oklahoma	230	173	168	182	753
Pennsylvania	11,465	8,930	8,620	7,124	36,139
Tennessee	454	371	357	328	1,510
Texas	102	81	83	76	342
Utah	397	309	257	234	1,197
Virginia	518	408	378	383	1,687
Washington	270	244	265	169	948
West Virginia	6,229	4,307	4,670	5,091	20,297
Wyoming	694	598	576	540	2,408
Other states *a*	10	8	14	11	43
Total bituminous	40,270	30,851	30,392	27,553	129,066

(*a*) Includes Alaska, California, Georgia, Idaho, North Carolina, Oregon and South Dakota.

Howat Given Jail Sentence and $500 Fine

ALEXANDER HOWAT and August Dorchy, district president and vice president, respectively, of the United Mine Workers of America in Kansas, convicted of a violation of the Kansas Industrial Relations Law, were sentenced on July 8 to serve six months in jail and pay a fine of $500, Judge Frank W. Boss, of the Cherokee County District Court, delivering the judgment. The judge also ordered the two men to give a bond of $2,000 each that they would not violate again the law under which the Industrial Court was established. However, as Howat and Dorchy had filed an appeal the court ordered that they retain their liberty on their present appearance bonds of $2,000. A new trial was denied them.

The judge could have been more severe, as the full extent of the law is a year in jail and a fine of $1,000. Howat addressed the court before sentence was passed, denouncing his trial and declaring that he had not been given fair treatment. He asserted that he did not know he was violating the law when he called a strike, and he complained that the court did him a wrong when it denied to members of the mine workers' union the right to sit on the jury. Judge Boss in passing sentence declared that to have allowed union miners to try the case would have been a travesty of justice.

The jury chosen unquestionably sympathized with the accused, all but one after the trial joining in an affidavit declaring that they did not believe the officials of the union just convicted guilty of "any wrong." The defense used the declaration as part of the claim for a new trial, but Judge Boss paid no attention to it.

The jurors' affidavit declared that the jury did not believe in the Industrial Court law and returned a verdict of guilty solely because they had made oath that "they would be governed by the law as set forth in the judge's instructions and the evidence, and that, had it not been for said law given them by the court in said instructions, not one of the said jurors would have made a finding that the defendants had done wrong."

Central Pennsylvania Coal Operators to Take Strenuous Action Against Union

INDIVIDUAL operators are strongly insisting that the Central Pennsylvania Coal Operators Association take some action upon the wage scale. Each day indicates more clearly the necessity for some definite stand if the district is to continue to do business.

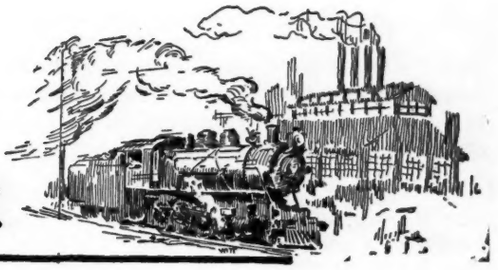
Important developments are brewing and it is quite likely that a definite stand will be taken within the coming week. T. H. Watkins, president of the Pennsylvania Coal & Coke Corporation, will speak at a meeting of the Rotary Club at Clearfield on July 14, at which time important announcements on the situation will be made. It is possible that a policy of dealing with the officials of the United Mine Workers will be announced.

Senator Walsh Demands Investigation of Alleged Washington Coal Lobby

INVESTIGATION of the alleged coal lobby in Washington is demanded by Senator Walsh, of Montana, in a minority report from the sub-committee of the Senate Committee on Judiciary on the King resolution for investigation of dye and other alleged lobby interests in Washington. The sub-committee majority, however, consisting of Senators Cummins, of Iowa, and Sterling, of South Dakota, recommend that the lobby investigation be confined to the dye interests, as specific charges were made in the Senate as to its existence and activities. Senator Walsh in his minority report says: "Equally specific charges have been made in the Senate touching the coal lobby," and recommends that the investigation cover interests which have attempted to influence tariff, revenue and other legislation pending in Congress "relating to the coal-mining industry and the transportation of coal." The Senator probably has in mind the charges of Senator Frelinghuysen, of New Jersey, that the National Coal Association, American Wholesale Coal Association, anthracite operators and Retail Coal Merchants' Association had opposed his coal bills.

DAN CAMPBELL, THE CHECKWEIGHMAN ordered off the property of the Pennsylvania Coal Co. during the strike which ended June 27, was reinstated on June 28 after a conference between the officials of the company and John Collins, district president, and Daniel McHugh, district board manager.

Production and the Market



Weekly Review

PRODUCTION of soft coal is now suffering from the nationwide hot wave. Every year, no matter how strong the demand, in July and August there is a slowing up in mining and movement of coal attributable to hot weather. In the week ended July 2 the output of soft coal, according to the Geological Survey, was 7,591,000 net tons, a slight decline from the 7,716,000 tons produced during the previous week. Production in the week of July 9, because of the holiday on the Fourth, was, of course, low. The hot weather slump is now upon us and as no field or market holds promise of early gains the next few weeks will be dull indeed.

Far-Sighted Buyers Quietly Purchasing

Prices are such that canny buyers are being tempted into purchases of storage coal on a scale few suspect. There is much lamentation about the delinquency of the consumer that is not justified—some are on the job and are getting coal at what our field correspondents describe as "ruinous" prices. *Coal Age* index of spot prices of bituminous coal went up one point to 90 on July 11 from 89 the previous week. There is nothing in prospect, however, to keep the price trend upward, and with the conviction gaining ground that coal freight rates are not to be reduced, the coal shippers who continue to pound away in their selling efforts are being rewarded in scattering business that would not otherwise be in hand. One house that recently put forth an intelligent, serious advertising effort to interest a special line of trade in storage coal has already felt the effect in inquiries and in sales.

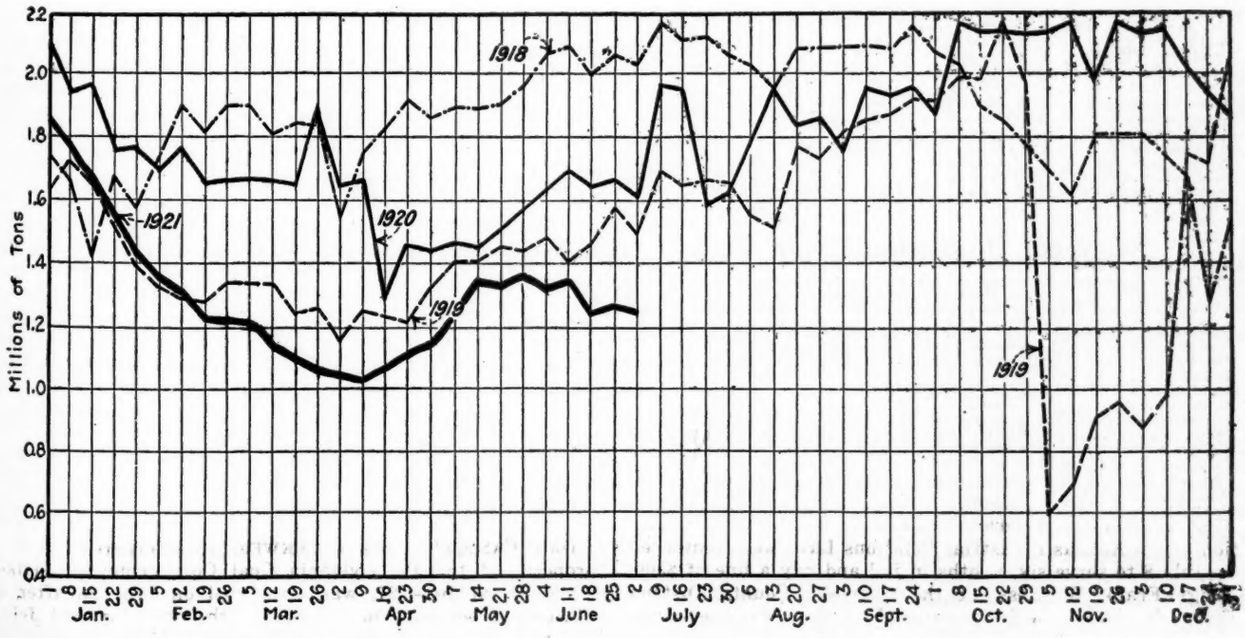
Exports and Lake Trade Fail to Bolster Output

Exports to Europe and the Lake business are no longer holding the output even to early June levels, the production in the Northern and Middle Appalachians fluctuating with the strength of these two outlets and the total production varying up and down from around seven and a half million tons a week as these fields respond to the only markets that have been active this summer.

Commenting on the fact that compared with the average of eight years preceding, 1921 is forty-one million tons behind in bituminous output up to June 30, the Geological Survey says that before concluding that this represents a shortage it should be remembered that there has been a greatly decreased consumption attendant on the business depression and that cumulative production is but little less than in 1914, a year of depression, and is even slightly ahead of 1915, when total output was 442,000,000 net tons.

Anthracite production is holding at a little better

Daily Average Production of Bituminous Coal*



*From weekly report of Geological Survey.

than 1,800,000 net tons a week, from 90,000 to 100,000 below the level of the early summer months. The total to date for the year to July 2 is 46,477,000 net tons, compared with 44,608,000 in the same period of 1920.

BITUMINOUS

In the face of poorer demand for soft coal, production continues to decline. During the week ended July 2, the total output, as shown by the report of the Geological Survey, declined 125,000 net tons to 7,591,000 tons. Loadings on Tuesday, July 5, reflect the holiday on the Fourth, being about 6,000 cars less than for the preceding Tuesday, and it is certain that observance of the holiday extended into the week, further reducing output.

Hampton Roads dumpings for foreign account continued heavy throughout the week ended July 2. According to the Geological Survey loadings were 75 per cent greater than during the week preceding. Total dumpings for the week ended July 7 were 538,735 net tons compared with 616,329 the week before. The end of the British strike has caused numerous cancellations of charters and softening of c.i.f. prices, late quotations being off as much as $1 from the figures of last week.

Inquiries coastwise continue almost nil. A few special lines in New England are making a fair showing, but in general industry sees no light ahead for some time to come. Operators are making special concessions to move both water and rail coals, but although this practice has become widespread very little business has resulted, and the market has only been weakened further.

June production was approximately 33,852,000 net tons, an increase over the May figure of 512,000 tons. However, June contained one more working day than May and the average daily production per working day declined from 1,325,000 to 1,302,000 tons. The following table shows the June output for nine years and the cumulative production in each year to June 30. It will be seen that the output in June, 1921, was smaller than in any June of recent years save one. In June, 1914, only 31,412 000 tons were produced. At that time, as now, a general business depression existed, and a strike lasting from April to July closed practically all the mines in Ohio.

Year	June Production	Cumulative Production to June 30
1913	37,405 000	226,000 000
1914	31 412 000	205,000,000
1915	33,957 000	193,000.000
1916	37 742 000	246,000 000
1917	46 824 000	273,000 000
1918	51 138 000	282 000 000
1919	37 054 000	214,000,000
1920	45 114 000	258 000,000
1921	33,852,000	196 000,000

If the second half of the year 1921 shows no greater output than the first half the total for the year will be less than 400,000,000 tons. The last year in which the country required less than 400,000,000 tons was 1909.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	June 7, 1921	June 28, 1921	July 5, 1921	July 12, 1921†
Pocahontas lump	Columbus	$5.75	$5.65	$5.75	$5.50@$6.00
Pocahontas mine run	Columbus	3.30	3.55	3.25	3.15@ 3.40
Pocahontas screenings	Columbus	2.65	2.40	2.35	*2.00@ 2.25*
Pocahontas lump	Chicago	5.25	5.65	5.65	*4.75@ 5.25*
Pocahontas mine run	Chicago	3.15	3.15	2.50	**2.00@ 3.25**
*Smokeless mine run	Boston	6.45	6.00	5.90	5.75@ 6.00
Clearfield mine run	Boston	2.35	2.20	2.10	*1.75@ 2.35*
Cambria mine run	Boston	3.05	2.85	2.80	*2.40@ 3.00*
Somerset mine run	Boston	2.25	1.95	1.90	*1.65@ 2.10*
Pool 1 (Navy Standard)	New York	3.50	3.20	3.15	*3.00@ 3.15*
Pool 1 (Navy Standard)	Philadelphia	3.35	3.00	2.80	2.75@ 2.85
Pool 1 (Navy Standard)	Baltimore	3.30	2.90	2.75	*2.60*
Pool 9 (Super. Low Vol.)	New York	2.85	2.75	2.55	2.35@ 2.75
Pool 9 (Super. Low Vol.)	Philadelphia	2.95	2.70	2.40	2.30@ 2.50
Pool 9 (Super. Low Vol.)	Baltimore	2.95	2.65	2.55	*2.25@ 2.55*
Pool 10 (H. Gr. Low Vol.)	New York	2.50	2.45	2.25	2.10@ 2.40
Pool 10 (H. Gr. Low Vol.)	Philadelphia	2.60	2.40	2.20	2.00@ 2.35
Pool 10 (H. Gr. Low Vol.)	Baltimore	2.35	2.30	2.25	*2.00@ 2.25*
Pool 11 (Low Vol.)	New York	2.15	2.15	1.95	1.90@ 2.00
Pool 11 (Low Vol.)	Philadelphia	2.35	1.90	1.90	1.75@ 2.00
Pool 11 (Low Vol.)	Baltimore	2.10	2.10	2.10	*1.75@ 1.90*
High-Volatile, Eastern					
Pool 54-64 (Gas and Steam)	New York	1.95	1.95	2.00	*1.75@ 2.15*
Pool 54-64 (Gas and Steam)	Philadelphia	2.05	1.85	1.75	1.75
Pool 54-64 (Gas and Steam)	Baltimore	1.85	1.70	1.85	*1.50@ 1.75*
Pittsburgh sc'd. gas	Pittsburgh	2.55	2.50	2.50	**2.85@ 3.00**
Pittsburgh mine run(steam)	Pittsburgh	1.95	1.85	1.85	**2.00@ 2.15**
Pittsburgh slack (gas)	Pittsburgh	1.75	1.60	1.60	*1.40@ 1.50*
Kanawha lump	Columbus	3.50	3.45	3.40	*3.00@ 3.50*
Kanawha mine run	Columbus	2.25	2.20	2.15	2.00@ 2.25
Kanawha screenings	Columbus	1.35	1.20	1.15	1.00@ 1.30
Hocking lump	Columbus	3.40	3.15	3.15	**3.00@ 3.50**
Hocking mine run	Columbus	2.15	2.10	2.15	2.00@ 2.25
Hocking screenings	Columbus	1.20	1.20	1.10	**1.15@ 1.25**
Pitts. No. 8 lump	Cleveland	3.25	3.25	3.25	3.00@ 3.50
Pitts. No. 8 mine run	Cleveland	$2.30	$2.10	$2.20	**$2.15@$2.30**
Pitts. No. 8 screenings	Cleveland	1.65	1.15	1.20	**1.20@ 1.30**
Midwest					
Franklin, Ill. lump	Chicago	3.65	3.55	3.80	*3.00@ 4.05*
Franklin, Ill. mine run	Chicago	3.00	2.90	2.90	**2.75@ 3.50**
Franklin, Ill. screenings	Chicago	2.00	1.90	1.90	1.25@ 2.50
Central, Ill. lump	Chicago	3.15	2.65	2.65	*2.00@ 3.00*
Central Ill. mine run	Chicago	2.50	2.40	2.40	2.00@ 2.75
Central Ill. screenings	Chicago	1.65	1.65	1.65	1.00@ 2.25
Ind. 4th Vein lump	Chicago	3.15	2.90	2.90	*2.35@ 3.25*
Ind. 4th Vein mine run	Chicago	2.75	2.50	2.50	2.25@ 2.75
Ind. 4th Vein screenings	Chicago	1.75	1.65	1.70	1.25@ 2.15
Ind. 5th Vein lump	Chicago	3.00	2.75	2.75	2.25@ 3.25
Ind. 5th Vein mine run	Chicago	2.50	2.40	2.40	2.00@ 2.75
Ind. 5th Vein screenings	Chicago	1.85	1.65	1.70	1.25@ 2.10
Standard lump	St. Louis	2.15	2.15	2.25	2.00@ 2.50
Standard mine run	St. Louis	1.75	1.75	1.75	1.75
Standard screenings	St. Louis	1.15	.85	.85	.85
West Ky. lump	Louisville	2.55	2.65	2.75	*2.35@ 3.00*
West Ky. mine run	Louisville	2.10	2.00	2.10	1.75@ 2.40
West Ky. screenings	Louisville	1.50	1.55	1.45	*1.00@ 1.75*
South and Southwest					
Big Seam lump	Birmingham	3.65	3.65	3.50	*3.25@ 3.50*
Big Seam mine run	Birmingham	2.60	2.50	2.25	*2.00@ 2.25*
S. E. Ky. lump	Louisville	3.70	3.70	3.45	**3.40@ 3.60**
S. E. Ky. mine run	Louisville	2.35	2.25	2.25	2.00@ 2.50
S. E. Ky. screenings	Louisville	1.35	1.40	1.25	**1.00@ 1.75**
Kansas lump	Kansas City	5.25	5.40	5.40	5.25@ 5.50
Kansas mine run	Kansas City	4.40	4.25	4.25	4.25
Kansas screenings	Kansas City	3.25	3.25	3.25	3.25

* Gross tons, f. o. b. vessel, Hampton Roads.
† Advance over previous week shown in **heavy type,** declines in *italics.*

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	June 28, 1921		July 5, 1921		July 12, 1921†	
			Independent	Company	Independent	Company	Independent	Company
Broken	New York	$2.61	$7.85@$8.15	$7.30@$7.75	$7.85@$8.15	$7.40@$7.75	$7.85@$8.15	$7.40@$7.75
Broken	Philadelphia	2.66	7.90@ 8.20	7.45@ 7.85	8.00@ 8.20	7.55@ 7.85	8.00@ 8.20	7.55@ 7.85
*Broken	Chicago	5.62	12.75	12.50	12.75	12.70	12.75	*12.45*
Egg	New York	2.61	7.85@ 8.50	7.30@ 7.75	7.85@ 8.50	7.40@ 7.75	*7.80@ 8.25*	7.40@ 7.75
Egg	Philadelphia	2.66	7.90@ 8.20	7.45@ 7.85	8.00@ 8.20	7.55@ 7.85	8.00@ 8.20	7.55@ 7.85
*Egg	Chicago	5.62	12.60	12.45	12.60	12.70	12.60	*12.45*
Stove	New York	2.61	8.15@ 8.60	7.60@ 8.10	8.15@ 8.60	7.70@ 8.10	*8.10@ 8.50*	7.70@ 8.10
Stove	Philadelphia	2.66	8.15@ 8.60	7.80@ 8.20	8.25@ 8.70	7.90@ 8.25	8.25@ 8.70	7.90@ 8.25
*Stove	Chicago	5.62	13.20	12.80	13.20	12.95	13.20	*12.70*
Chestnut	New York	2.61	8.15@ 8.50	7.60@ 8.10	8.00@ 8.60	7.70@ 8.10	*7.80@ 8.25*	7.70@ 8.10
Chestnut	Philadelphia	2.66	8.15@ 8.50	7.75@ 8.20	8.25@ 8.60	7.80@ 8.25	8.25@ 8.60	7.80@ 8.25
*Chestnut	Chicago	5.62	12.95	12.70	12.95	12.95	12.95	*12.70*
Pea	New York	2.47	5.50@ 6.00	5.85@ 6.20	4.75@ 5.00	5.95@ 6.45	4.75@ 5.00	5.95@ 6.45
Pea	Philadelphia	2.38	5.50@ 5.75	6.10	5.50@ 6.25	6.00@ 6.20	5.50@ 6.25	6.00@ 6.20
*Pea	Chicago	5.62	10.90	10.80	10.90	11.20	10.90	11.20
Buckwheat No 1	New York	2.47	2.75@ 3.00	3.50	2.75@ 3.25	3.50	*2.60@ 3.00*	3.50
Buckwheat No. 1	Philadelphia	2.38	2.50@ 3.00	3.50	....	3.50	2.50@ 3.00	3.50
Rice	New York	2.47	2.00	2.50	1.75@ 2.25	2.50	*1.60@ 2.00*	2.50
Rice	Philadelphia	2.38	1.75@ 2.25	2.50	....	2.50	*1.75@ 2.00*	2.50
Barley	New York	2.47	1.00	1.50	.75@ 1.50	1.50	*.60@ 1.25*	1.50
Barley	Philadelphia	2.38	1.00@ 1.25	1.50	....	1.50	*.75@ 1.25*	1.50
Birdseye	New York	2.47	.....	2.50	....	2.50	....	2.50

* Prices and freight rates net tons; quotations f.o.b. cars, Chicago.
† Advances over previous week shown in **heavy type,** declines in *italics.*

The distribution of cargo coal loaded at lower Lake Erie ports has been similar to that of the past two years. Total shipments to the end of May—4,630,000 tons—were more than three times as large as in 1920 and but 83,000 tons less than the heavy tonnage shipped in 1919. The proportion shipped to American ports was 79.6 per cent in 1921 against 82.7 per cent in 1919 and 76.2 in 1920.

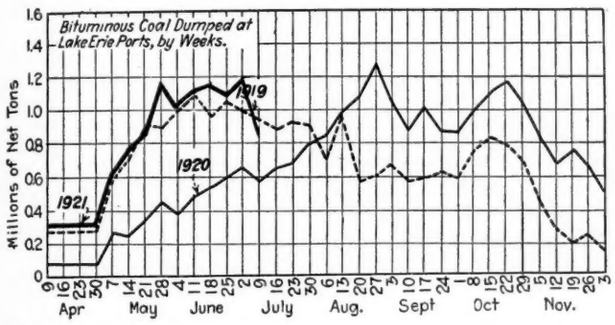
Shipments to American ports on Lake Superior were relatively as well as absolutely less than in 1919, while those to Canadian points were proportionately higher. The tonnage shipped to Lake Michigan ports was more than 100,000 tons greater than in 1919 and was 29.3 per cent of the total, against 26.4 per cent two years ago.

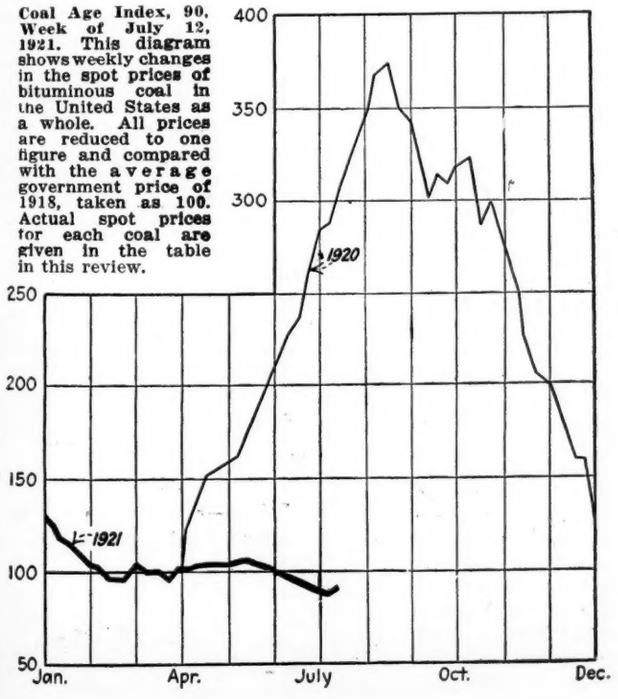
Lake shipments through the Soo canals for June were 3,009,392 net tons of bituminous and 247,048 tons of hard coal. Receipts at the Duluth-Superior harbor in June were 2,125,453 tons of the former and 192,830 tons of the latter. The total receipts exceeded those of May by nearly 35 per cent. Cumulative receipts for the season were 4,243,623 tons, an increase over the corresponding period in 1920 of 2,855,606 tons.

RECEIPTS OF COAL AT DULUTH-SUPERIOR HARBOR DURING THE SEASON OF 1921
(in net tons)

Month	Hard	Soft	Total
April	83,058	120,212	203,270
May	173,190	1,548,880	1,722,070
June	192,830	2,125,453	2,318,283
Total to June 30	449,078	3,794,545	4,243,623

Lake dumpings for the week ended July 11 declined sharply. Cargo loadings were 783,360 net tons, vessel fuel 23,090 tons, making a total of 806,450 tons, as compared with 1,145,517 the preceding week. Total movement for the year to date is 11,067,735 tons as against 4,772,342 tons in 1920.





Coal Age Index, 90, Week of July 12, 1921. This diagram shows weekly changes in the spot prices of bituminous coal in the United States as a whole. All prices are reduced to one figure and compared with the average government price of 1918, taken as 100. Actual spot prices for each coal are given in the table in this review.

Estimates of Production

FROM THE WEEKLY REPORT OF THE GEOLOGICAL SURVEY

(NET TONS)

BITUMINOUS COAL

Total Bituminous, Including Coal Coked

	1921 Week	1921 Calendar Year to Date	1920 Week	1920 Calendar Year to Date (a)
June 18b	7,551,000	183,021,000	10,095,000	237,340,000
Daily average	1,258,000	1,279,000	1,683,000	1,653,000
June 25b	7,716,000	190,737,000	10,556,000	247,896,000
Daily average	1,286,000	1,279,000	1,759,000	1,657,000
July 2c	7,591,000	198,328,000	10,286,000	258,182,000
Daily average	1,265,000	1,279,000	1,714,000	1,659,000

(a) Less one day's production during New Year's week to equalize number of days covered for the last two years. (b) Revised from last report. (c) Subject to revision.

ANTHRACITE

	1921 Week	1921 Calendar Year to Date	1920 Week	1920 Calendar Year to Date(a)
June 18	1,941,000	42,762,000b	1,853,000	40,960,000
June 25	1,847,000	4,609,000b	1,870,000	42,830,000
July 2	1,868,000	46,477,000	1,778,000	44,608,000

(a) Less one day's production during New Year's week to equalize number of days covered for the last two years. (b) Revised from last report.

BEEHIVE COKE

Week Ended July 2 1921(a)	Week Ended June 25 1921(b)	Week Ended July 3, 1920	1921 to Date	1920 to Date(c)
48,000	50,000	374,000	3,401,000	10,906,000

(a) Subject to revision. (b) Revised from last report. (c) Less 2 days production during New Year's week to equalize number of days covered for last two years.

ANTHRACITE

Production of hard coal during the week ended July 2 was 1,868,000 net tons, 21,000 tons in excess of the preceding week's output. With retail yard receipts heavier than deliveries to householders, orders for domestic sizes are being obtained with increasing difficulty.

It is interesting to note that independent prices are being cut, as is usual in periods of dull markets, but with no apparent effect, and some operations have already been forced to close. The public is not able to spend money on house coal for storage purposes, and while some argue that this will lead to a wild autumn rush, there are others who remember former lean years when householders practiced rigid economy to the detriment of the usual seasonal tonnage movement.

COKE

Beehive coke production continues its downward trend, with the zero mark as the apparent objective. The output for the week ended July 2 is estimated by the Geological Survey at 48,000 net tons, as compared with 50,000 tons the week preceding. Cumulative production for 1921 to date is 3,401,000 tons, less than one-third of that in 1920.

An additional wage cut of 10 per cent by some Connellsville independents has caused a slight resumption of work, but the market still may be termed as lifeless. Odd lots of furnace coke have been cleaned up and there are fewer offerings at "what it will bring." Connellsville furnace is now quotable $3@$3.25; foundry $4@$4.50.

AN ANNOUNCEMENT ISSUED July 6 by the Pennsylvania Coal & Coke Corporation stated that the company had made a complete revision and reduction in all salaries, averaging about 20 per cent, applying to all officers, superintendents, foremen, monthly men, clerks and stenographers. This reduction applies to all operating departments as well as the general offices in New York. The company is now operating only nine mines out of thirty-four, owing to the impossibility of meeting competition of other fields operating on the 1917 scale of wages. The nine mines operating are working only from one to four days a week.

Foreign Market And Export News

Hampton Roads

In spite of the settlement of the British strike, cargoes of coal have gone forward steadily during the week, and many dealers have contracts for still further shipments to Great Britain and her dependencies. Several cargoes, however, consigned to British ports, have been canceled, which is thought to have had some effect in reducing the market. Other cargoes have been purchased afloat during the week, after they had loaded preparatory to moving to the British Isles.

C.i.f. prices have softened with the ending of the British deadlock. In some cases a drop of $1 per ton has been recorded from the figures quoted last week.

During June a total of 278 coal cargoes left this port for foreign shores, which almost establishes a record for one month's business. British vessels lead, with American ships next.

Clearances last week were as follows. (Ports given when of record):

		Tons
For Brazil:		
Am. Schr. Charles Davenport, for Buenos Aires		1,810
For France:		
Bel. S.S. Nervier, for Havre		7,146
For Greece:		
Ger. SS. R. C. Rickmers, for Piraeus		7,000
For Italy:		
Ital. SS. Luigi Rizzo, for Civita Vecchia		7,358
Ital. SS. Tuscolo, for Palermo		6,588
For Spain:		
Span. SS. Cabo Espartel, for Seville		2,614
For United Kingdom:		
Am. SS. Henry Clay,	for Falmouth	10 083
Am. SS. West Galeta,	for Falmouth	6 825
Am. SS. Nyanza,	for Falmouth	6,783
Am. SS. Evergreen City,	for Falmouth	6,515
Am. SS. Invincible,	for Falmouth	10,019
Am. SS. Sunelsco,	for Falmouth	4,399
Am. SS. Eastern Breeze	for Falmouth	4,921
Am. SS. Surailco,	for Falmouth	4,388
Am. SS. Suholco,	for Falmouth	4,384
Fr. SS. Surville,	for Falmouth	3,355
Br. SS. Manhattan, for Liverpool		1,977
Br. SS. Tresillian, for Queenstown		5,521
For West Indies:		
Am. Schr. Elizabeth Freeman, for Teneriffe		2,538
For Gibraltar:		
Am. SS. Virginian		10,067
Br. SS. Vestalia		7,318
Br. SS. Levent, for Funchal		4,473
Br. SS. Bournesmouth, for Las Palmas		6,895

C.I.F. PRICES—AMERICAN COAL—GROSS TONS

	June 28, 1921	July 5, 1921	July 12, 1921
United Kingdom	12.60	12.15	11.00@11.35
West Italy	12.25	12.40	11.75@12.00
French Atlantic	.....	11.90	11.00@11.35
Scandinavian	13.35	13.40	13.00
The Plate	11.40	11.40	.....
Rotterdam	.....	11.40	11.00
Havana	8.60	8.90	8.50

English Market Gains Strength

(By cable to Coal Age)

British coal mines are very slowly getting back in the producing state. Although no official figures of production are yet available for the first week of work after the strike, unofficial reports indicate very small outputs, for which there is heavy demand Inland and for local bunkers, leaving almost nothing for export. The official figures for exports from the United Kingdom in June, the last month of the strike, show but 7,502 gross tons.

Prices of best Admiralty large coal f.o.b. Cardiff were 47s. 6d.@50s. on Monday of this week, a gain over 45s. for the same coal a week ago. Best smalls for bunkers are now quoted at Cardiff at 24@25s. Prices of best Durham at Newcastle-on-Tyne are now 40s. compared with 35s.@37s. 6d. a week ago. No change is reported in Tyne primes at 40s.@42s. 6d.

It is reported that the rate on coal freights from the United Kingdom to the Plate has been fixed at 17s. 9d.

French Lessons from British Strike

Paris Correspondence

Although for the last seven or eight months purchases of American coals for French account have been practically nil, the recent British strike has taught French buyers once for all that it will not do to be dependent upon only one source of supply for such portion of their coal requirements as cannot be filled by either home production, German, or Saar coals.

Under prevailing circumstances the strike proved to be rather a boom than otherwise to French coal interests, as it permitted the sale of a fairly large tonnage which encumbered the market. But what would be the position if, admitting a general resumption of trade and France's industry were fully at work, there were to be another miners' strike? It would be simply disastrous and, having realized this after two nearly consecutive strikes, quite a lot of French consumers are examining how they can keep in touch with the American market, even if they have to pay more for such portion of their requirements as would be placed with U. S. exporters. It is therefore to the interest of American exporters to study the French trade attentively, and try and meet this desire by entering French business on really competitive lines, if they care for this trade at all.

French Coal Market Liquidating

Special Correspondence to Coal Age

Much nervousness prevails in French industrial circles in view of the possibility of a resumption of business because of the present low level of stocks. Many Chambers of Commerce and even some members in Parliament have officially suggested the prohibition of exports of coal from France. It seems that there is hardly any need for this as such coals as were supplied chiefly to Great Britain (11,000 tons in April and 450,000 tons in May) really represent only certain grades of coals which the French mines could not dispose of Inland, and a certain quantity of Saar coals which was actually in excess of French requirements.

Stocks of coals in French depots in metric tons on April 30, 1921, were:

Havre	1,257,230
Marseilles	1,137,071
Rouen	25,814
Strasbourg	526,426
Rochefort	118,231
Bordeaux	1,935,060
St. Nazaire	252,205
Dieppe	49,470
Cherbourg	391,819
La Pallice	94,839
Brest	1,093,419
Boulogne	50,939
Dunkirk	14,520
Chantenay	119,579
Other depots	115,353

The total was 7,181,975 tons, of which 738,599 tons was in the various ports (1,421 tons floating and 737,358 tons discharged) as against 1,037,730 tons in ports on March 31,

The total production of coal from French mines in April was 2,257,444 tons and for the Saar district 693,083 tons. Stocks at the French mines on the same date were 1,566,306 tons and at Saar mines were 467,655 tons.

Stocks held by the railway companies at the end of March were 2,312,390 tons compared with 2,183,778 tons at the end of April, a quantity sufficient for 75 days operation. Therefore, taking into account the present low home consumption and the fair stocks of French and Saar coals which will rapidly increase now that exports to the U. K. have come to an end there is no cause for immediate alarm.

Coal available for consumption in France in March and April, 1921 (not including coke and coking fines) is shown as follows:

	Metric tons—April	Metric tons—March
French	1,782,531	1,878,541
Saar	200,335	192,306
British	57,413	363,126
Belgian	119,973	86,414
German	577,428	593,998
American	29,119	28,754
	2,766,799	3,143,139

The item "French coals" includes production of the Lorraine mines. Under "Saar coals" is represented only coal actually delivered to France, total production of this district having been 597,235 tons in April. These figures show a reduction of more than 370,000 tons over the March and February available quantities, and nearly 500,000 tons as compared with the January figures. They also illustrate the present poor conditions of French Industry.

Italian Market Weak

(By cable to Coal Age)

Limited demand for coal in Italy is holding prices down, despite the small imports in recent weeks. At Genoa, American steam coal is selling this week at from 305 to 320 lire per gross ton, free on truck, compared with as high as 370 lire early in May.

Bunker Prices—F.O.B.—Gross Tons

(By cable to Coal Age, July 8)

Welsh coal at:	
Gibraltar	70s.
Port Said	84s.
Singapore	95s.
Rio Janeiro	100s.
Genoa	73s. trimmed
Antwerp	150@160 fr. trimmed
American coal at:	
New York	$5.65@$6.00

United States May Exports of Coal and Coke by Customs Districts

Exports of coal and coke by customs districts from the United States in May, 1921, as reported by the Bureau of Foreign and Domestic Commerce, were as follows, in gross tons:

Customs Districts	Coal: Anthracite, Tons	Coal: Bituminous, Tons	Coke Tons
Vermont	2,081	435	403
Massachusetts	3	.....	.....
St. Lawrence	120,951	118,504	885
Rochester	84,303	37,117	215
Buffalo	192,638	189,629	5,132
New York	10,939	6,724	302
Philadelphia	9,910	42,855	.....
Maryland	.....	234,884	1,529
Virginia	2,264	1,056,601	.....
South Carolina	.....	19,745	.....
Georgia	.....	100	.....
Florida	.....	5,206	156
Mobile	.....	537	.....
New Orleans	.....	1,666	39
Galveston	.....	.....	25
San Antonio	5,001	237	690
El Paso	.....	4,285	2
San Diego	1	19	.....
Arizona	.....	3,269	.....
San Francisco	.....	.....	18
Washington	.....	306	.....
Dakota	248	7,212	139
Duluth and Superior	211	1,744	167
Michigan	400	100,411	5,634
Ohio	5,358	668,888	305
Total for May	434,308	2,500,374	15,641
Total for April	368,534	1,453,027	18,863

BUNKER COAL SUPPLIED TO STEAMERS IN THE FOREIGN TRADE

Customs Districts	Tons
New York	273,944
Philadelphia	33,857
Maryland	46,846
Virginia	335,189

SPANISH PRODUCTION IN 1919 was 5,920,491 metric tons. Of this amount 263,338 tons were anthracite, 552,866 tons lignite, and 5,104,287 tons pit coal. It is pointed out that the total production falls about 1,000,000 tons short of the amount required for Spanish industry.

Reports From the Market Centers

New England

BOSTON

Dearth of Inquiry—Operators Hard Pressed to Find Orders—Accumulations at Hampton Roads—Anthracite Retail Trade Extremely Dull.

Bituminous—Inquiry is almost nil. There are a few scattering requests for spot coal but these are from ultra conservative mill buyers who wish to carry into the winter their usual reserve. For the most part, however, steam coal is at a standstill.

An increased number of Shipping Board bottoms actually in use has been mentioned recently as a favorable sign, but general business in New England shows no perceptible reaction. A few special lines in textiles and in shoes are making fair showing, but industries here in general seen no light ahead.

Operators in all districts find it extremely hard to move coal. The few who are so fortunate as to have export orders are able to run from two to four days per week. Strenuous efforts are made on behalf of July coal but the response is in no way encouraging.

In some instances, producers are scaling down prices to meet special situations. At the utmost not more than a few thousand tons have been placed in this way, although one would gather from comment in the trade that the practice is widespread. Receipts as yet do not show any increased movement, however, and are not likely to for weeks to come.

Inquiry for Pocahontas and New River shares the same slackness that prevails on coal from other districts. Spot inquiry coastwise amounts to nothing, and off-shore there is only light request.

Anthracite—Retail dealers throughout New England complain of extremely dull business. Householders generally have not the money for their usual purchases and there is besides a certain warm weather indifference as to next winter's needs. A result is that dealers are getting stocked to the limit and practically all shippers are looking for orders. Chestnut, particularly, is getting increasingly hard to move.

Tidewater—East

NEW YORK

Demand for Anthracite Lower—Independents Hustle for Business—Bituminous Moves Slowly, But Quotations Show Little Change.

Anthracite—There has been no improvement in the market. Demand is easier if anything, and there have been many cancellations of orders. Under existing conditions, the market has not suffered because of the many local labor troubles and suspensions which have taken place in the coal fields during the past few weeks. Demand along the line is reported as being in better shape.

The independents are selling at slight premiums for the most part and considerably below their announced schedules for July. While the average price quoted for stove was around $8.25, there were orders received as high as $8.50 by some middle houses.

Pea is the hardest of the domestic sizes to move and is being quoted at considerably below the stated schedules of the independents. The steam sizes are unchanged so far as demand goes. Barley is extremely slow and some sent to this market brought less than the freight charges.

Bituminous—The present condition of the market is likened to the cleaning up of a wreck. Some dealers call attention to market conditions of the past several weeks with scarcely any buying except in emergency, although the prices have been and are low, and now because of this so-called buyers' strike with surplus stocks almost out of the way, claim that the turn in the market is about due and should be here about Sept. 1. Then there is the less optimistic dealer who refuses to see a change in prospect unless industrial conditions improve.

Locally, conditions are quiet. Demand is slow but prices have been maintained at about last week's level because production has not been unloaded at this Tidewater. On July 8 there were in the local pools 286 cars and outside of the pools 1,444 cars, as compared with 1,730 cars and 2,433 cars respectively on June 8.

Quotations f.o.b. piers differ slightly from last week. Pool 1 was quoted $6@$6.25; Pool 9, $5.75@$6.10; Pool 10, $5.45@$5.75 and Pool 11, $5.15@$5.40. Mine quotations appear in the Weekly Review.

PHILADELPHIA

Anthracite Continues to Ease Off—Mines Likely to Curtail Work—Steam Coals Duller, with Occasional Price Reductions—Bituminous Unchanged—Light Buying—No Early Revival Seen.

Anthracite—Further easing off in buying by the consumer is the feature of the market and the point is fast being reached where the retail trade will be as quiet as it has ever been in the most normal of years.

Most retailers have done their best to keep the mines going by withholding cancellations until the last possible moment. However, the saturation point is close to being reached and the holding of orders is growing. Stocks of nut and pea are close to the record, at least for this time of the year.

There is no question but what the companies will stand firm on their price schedules, and the only chance of a reduction is by the independents, the ones who have always shaded prices in the summer. Due to changed conditions, though, it can be said that this is not at all probable. To be sure there are certain few of the lesser individuals who this week have tried the effect of cut prices. These are mostly the concerns who took the extreme top of the market in the days of shortage, and as today finds them with practically no regular customers they are forced to this expedient to keep going at all.

Some dealers are becoming skeptical of a particularly heavy fall and winter trade, despite the number who have not taken coal in during the summer. Those of long experience reason that the buying power has been so greatly curtailed that the householder will economize this winter as he has never done before.

Steam coals became particularly heavy recently and cuts as much as 75c. a ton have been heard on buckwheat, rice and barley, and while this moved some tonnage it has made very little impression on the amount that has been produced.

Bituminous—The market is unchanged and very little coal is being moved. Sales recently have been close to the minimum, the consumer displaying more reluctance than ever to buy. As there were some recessions in spot prices over a week ago the buyer seems to think that further cuts may come.

Inasmuch as there has been no definite appeal for a reduction in freight rates, the buyer is beginning to believe that no effect from this source will be felt for months, possibly not during the present year. The present market is so close to a normal summer of six or seven years ago, that those most interested are coming to the belief that the summer will be more than spent before anything like a revival will come and they will be glad if it actually does happen then, of which quite a few have some doubts.

BALTIMORE

Another Bad Break in Soft Coal—Export Movement Holds Up—Political Play to the Galleries on Hard Coal "Combine" Inquiry.

Bituminous—There has been a general break in offerings in the spot market. Some producers are refusing to sell at the lowest figures, preferring to lose a portion of business rather than fall to the level of some competitive operations.

The home demand is extremely flat and even at the ridiculously low figures of the present there is no rush to buy and store. Best grade steam coals have actually passed hands on the spot market here within the past few days as low as $2.25. Pool 10 has sold as low as $2 and Pool 11 has been offered $1.70@$1.75. High-grade gas lump is offering around $2.25 in some cases, and West Virginia mine run has appeared here at $1.35@$1.50.

The export movement, which continues fairly heavy despite some cancellations of charters, is the only bright feature. During June, due to a big spurt at the end of the month, the movement from Baltimore reached a total of 332,419 tons cargo and 37,844 tons bunker. The July movement so far is running up well.

Anthracite—Following up the "campaign" started by a Maryland congressman in which retail coal merchants were charged with a combination of illegal nature to fix prices, policemen all over Baltimore are making a block canvas to find out just how much coal purchasers have paid for anthracite for several years back. The state's attorney says he does this to prove that the prices are always the same and will show a combine. All of which is entirely unnecessary except as a play to the gallery. The official records of the Maryland Fuel Administration would give the attorney all this information. And meanwhile some thinking men in the public are beginning to realize how much more the public may have to pay if all restrictions of a high-grade association of coal men for fair dealing are removed.

The majority of the dealers have added 25c. to the retail cost of all sizes with the exception of pea and buckwheat. This was done as an individual matter, the dealers apparently feeling that because of failure to advance retail costs in Baltimore in May or June, while wholesale prices advanced May 1, June 1 and July 1, that action was necessary.

BUFFALO

Conditions Continue Unfavorable—No Indication of a Trade Stir—Slack Coal Offering at Any Price—Anthracite Moving Slowly.

Bituminous—Movement is still slow, with no promise of improvement right away. All that the coal trade can do is to wait. It is merely an echo of the state of business generally and it will come back to its own when other things move as they should.

The operator still complains of an output that is greater than the state of trade will warrant and he is easily able to show that when the demand does begin to increase the output will go right along ahead of it and keep the prices down. Still that is the only way out and if there is profit now there will be more then.

Prices continue unsteady at about $3 for Youghiogheny gas lump, $2.75 for Pittsburgh and No. 8 steam lump, $2.45 for Allegheny Valley mine run and $1 for slack, to which add $2.36 to Allegheny Valley and $2.51 to other coals, to cover freight.

Anthracite—A city coal man remarks that it is a rarity to see a coal wagon on the street at delivery work and it is a fact that the movement is decidedly small.

The various changes in prices have upset calculations somewhat. Some independents advanced as far as they felt it safe to do so. Some of them have made a price of $8 on furnace sizes. In any case the demand is so light that there is prospect of considerable shutting down unless orders increase, which is not likely. Local retail prices have advanced but slightly, one circular making them at the curb $12.70 for grate and egg, $12.95 for stove and chestnut, $10.85 for pea and $8.75 for buckwheat. It is hard to sell chestnut at any price.

Lake loading is falling off a trifle and it will decline more if the sales from the Upper Lake docks do not improve soon. The season movement has kept up well, being 1,200,288 net tons to July, as against 1,013,542 tons to the same date last season. For the week ended July 2 the amount was 107,500 tons, of which 30,200 cleared for Duluth, 24,400 for Milwaukee, 15,000 for Chicago, 10,500 for Fort William, 7,500 for Port Arthur, 6,800 for Waukegan, 7,500 for Sheboygan and 5,600 for the Soo.

HAMPTON ROADS

Trading Less Active—Prices Soften—June Dumpings Heaviest on Record.

Business at the piers for the week ended July 7 was somewhat less active, a total of approximately 100,000 tons less than the week before being dumped. Dealers attribute the slump in business to the settlement of the British strike.

Prices also dropped. Pools 1 and 2 could be bought at the end of the week for $5.75@$6. Other pools were being quoted at $5.25 for the lowest bids, with many buyers at this price. The high-volatile grades were more in demand at the end of the week.

Only about 145,000 tons of vessel tonnage awaited cargoes at the end of the week, as against approximately 350,000 tons the week before. Accumulations at Tidewater, however, remain at approximately the same figure.

Dumpings for the month of June, reaching a total of 2,200,000 gross tons broke all previous records for coal dumpings at this port, the high point of July, 1920, even being exceeded. The N. & W. piers lead with approximately 844,000 tons, the C. & O. following with 833,000 tons, and the Virginian piers with approximately 533,000 tons.

A comparison of the situation at the piers is as follows:

	Week Ended June 30	Week Ended July 7
N. & W. Piers, Lamberts Point—		
Cars on hand	4,035	3,568
Tons on hand	197,470	180,532
Tons dumped	175,680	206,228
Tonnage waiting	113,800	38,207
Virginian R. R. Piers, SewallsPoint—		
Cars on hand	1,818	2,105
Tons on hand	90,900	105,250
Tons dumped	144,196	106,842
Tonnage waiting	28,453	8,989
C. & O. Piers, Newport News—		
Cars on hand	2,042	2,136
Tons on hand	102,100	106,760
Tons dumped	230,418	167,944
Tonnage waiting	224,055	100,375

Northwest

MINNEAPOLIS

No Buying, Even in Face of Rising Costs—Dock Stocks Growing Troublesome—Freight Revisions Are Disappointment.

People in the coal trade are exerting every persuasion they know to induce earlier buying, but so far without much success. The Pennsylvania State Tax is expected to add 30@50c. a ton to the cost of hard coal,

but apparently people refuse to believe it possible for costs to go up, and are holding off. Some of the trade are about disgusted with the whole situation, and are inclined to simply let things go until consumers are ready to talk business, and then simply quote the going price, whatever it may be, for taking or leaving.

All the while, soft coal stocks are piling up at the docks, but very little is moving to the interior. Unless there is a quick change for a heavier tonnage to the interior, the docks will be loaded to their limit by Aug. 1, and their capacity is far from sufficient to run the Northwest through a normal winter. The docks should be emptied once and filled a second time in a season, to give a reasonable supply to the Northwest. This in turn must be augmented by the tonnage which comes all-rail.

The dock trade has been working hard to secure contracts for the winter, but aside from some railroad business and a little public service supply, does not seem to have accomplished much. The prices which have been made have been very close. Some very low all-rail prices have also been made for certain classes of business. But buyers generally have simply refused to listen.

Revised coal freights on interstate business from the docks to points in Minnesota and the Dakotas, have proved to be a general disappointment. According to figures compiled by the Minnesota Railroad and Warehouse Commission, of 187 stations, there are 176 which will have increases on soft coal ranging 13½@67½c., and 11 which will have no change. On hard coal, there are 130 increases, 37 decreases and 20 without change. Hard coal increases are 6c.@47c. The state commission is opposing the rates and will join the fight planned by the civic associations of Minneapolis and St. Paul.

Northwestern railroads are reported to be about to place orders for coal, as a result of the saving accruing under the revised wage scale, which became effective July 1.

MILWAUKEE

Buying at a Standstill—Anthracite Advance Looked for—Supply by Lake Continues Good.

There is absolutely nothing doing at the present time in the way of marketing coal. Demand has ceased almost entirely, and loaded coal trucks have become a rarity on the streets.

June prices still prevail. No reason has been assigned for the deviation from the customary practice of advancing anthracite 10c. per ton until September. However, representatives of mines forecast a slight increase in price in the near future, as the result of the Pennsylvania tax on hard coal.

Bids on 85,000 tons of bituminous for state use have been rejected by the State Engineer who claimed that the bids were made up on May 18, and that since that time the market has taken such a slump that it would be unwise to accept them. It is understood that the bids averaged $6 per ton.

A comparison of receipts by Lake during April, May and June for the last four years, is as follows (in net tons):

Year	Hard	Soft	Total
1921	400,481	1,134,515	1,534,996
1920	265,871	354,035	619,906
1919	263,572	1,269,892	1,533,464
1918	164,889	827,438	992,327

Receipts for July thus far have averaged over 16,000 tons per day.

DULUTH

Dock Congestion Growing—Prices Unchanged—June Shipments Heavier—Anthracite Receipts Continue Light.

While coal congestion continues to grow steadily worse, a ray of hope for some relief has appeared in the report that coal shipments from Duluth-Superior docks during June were larger than during any similar period this year, amounting to 9,557 cars, against 7,883 cars during May, and 10,401 cars in June last year. For the six months to June 30, however, shipments were only 47,288 cars, against 116,632 cars during the same period last year.

Docks operating at Duluth are counting on a substantial pick-up in demand from country dealers if the present bright prospects for crops in the Northwest are maintained. Virtually no change has been recorded in prices.

Falling off in anthracite shipments has characterized the dock receipts for the past week. This is due to the inability of dealers to finance purchases from dock men and the unwillingness of the consumer to buy. Last week forty-nine cargoes arrived, of which only two were anthracite. Twenty-four cargoes are reported on the way with the same number of anthracite as was received last week.

Tonnage unloaded at the docks this season up to June 30 aggregated 4,243,623 net tons, 3,794,545 of bituminous and 499,078 tons of anthracite. Soft coal receipts were 2,829,808 tons in excess of last year and hard coal receipts were 25,798 tons more than in 1921, up to the same period. Receipts during June aggregated 2,318,283 tons, including 192,830 tons of hard and 2,125,453 tons of soft coal.

Inland West

DETROIT

All Demands Continue Dull—Little Distress Coal — Stocking Program Avoided.

Offerings of bituminous seem to have no attraction for consumers of either steam or domestic sizes. The interest of domestic buyers has reached the vanishing point with the continuance of temperature conditions severely oppressive in their torridity.

The very limited demand for steam coal is conceded to be primarily the outgrowth of the generally unsatisfactory condition of business in manufacturing and industrial lines. With daily consumption greatly curtailed by the operation of factories and industrial plants on a reduced production basis, buyers find it possible to work along for some time on small orders.

A tendency is observed among some of the steam plants to avoid stocking in the belief that whenever more fuel is needed they will be able to obtain it in the spot market at favorable prices.

West Virginia lump is quoted $3.25 @$3.50, mine run is $2@$2.50 and nut and slack $1.90@$2. Lump from Ohio mines is $3@$3.25, mine run $2 @$2.25 and nut and slack $1.15@$1.25. Smokeless lump and egg is $5.25@ $5.50, mine run $3.25@$3.50, nut and slack $2 to $2.25.

CINCINNATI

Market Is Demoralized — No Price Stability—Screenings Stronger—Retail Prices Off.

Holiday dullness seemed to have little effect on conditions following the Fourth. There is little coal in distress, but there are operating companies who use a reduction in price to sell their coal, and with these forced reductions, all signs of stability seem to have been lost. Slack was still low in some spots but gained a bit of strength.

Some Kentucky mine run is in distress at Latonia, otherwise the mine prices generally obtain. Slack is quoted 90c.@$1.50, depending upon quality and mine orders for lump; mine run $1.75@ $2.25, and block $3@$3.50.

Logan, Kanawha and Kenova groups are asking $1@$1.50 for nut and slack and are getting $1.75@$2.25 for mine run, some in distress selling as low as $1.60, and $3 and upward is being asked for lump with some actual sales down to $2.75.

Smokeless has shown little change. Lump is still $5.50, but some of the smaller companies report sales down to $5 and nut and egg is also off, ranging $4.75@$5. Slack has all sorts of prices, smaller companies, it is said, taking $1.75@$2.25, while the larger operations are still quoting $3.

Retail prices on smokeless have dropped, lump being quoted $9.75@$10, mine run $7.25@$7.50 and slack $6.75; best bituminous block is held at $9, lump $7.25@$7.50, mine run $6.75@$7 and slack $5@$6.

COLUMBUS

Domestic Trade Shows No Life—Screenings Stronger—Steam Demand Is Still Quiet—Lake Market the Best Feature.

No appreciable increase in domestic demand is reported in the central Ohio territory. Dealers are only placing a few orders to fill in broken stocks

while consumers are still playing a waiting game. The feeling that freight rates will soon be reduced has not been dispelled and consequently householders are waiting for lower prices. The retail price list is well maintained at former levels.

Little activity has developed in the steam trade. While some plants resume others are curtailing and the net result is about the same as formerly. There is no increase in the demand for railroad fuel. About the best customers are public utilities. One of the features of the steam trade is more strength in screenings. This is not caused by increased demand but rather by a still further curtailment of lump production.

The output in Ohio fields is still low. In the Hocking Valley the output is less than 25 per cent and nearer to 20 per cent of normal. Crooksville and Cambridge fields report about the same ratio of production.

A steady flow of coal to the lower ports for shipment to the Northwest is reported. The T. & O. C. docks during the week ended July 2, loaded 58,049 tons as compared with 55,811 the previous week, making a total of 445,923 for the season. During the same week the H. V. docks loaded 176,762 tons as compared with 189,072 the previous week, making 1,739,401 tons for the season. This is far in excess of the tonnage moved up to July 3, 1920.

CLEVELAND

Lake Movement Slowing Down—R.R. Outlook Better—Retailers Raise Anthracite Prices—Industrial Demand Quiet.

Bituminous—The decrease of about 12 per cent in employment in Cleveland during the last month, as reported by the Department of Labor helps explain some of the increased dullness which the coal trade has been experiencing. Industrial buying is extremely low and there are no present indications of improvement, during the summer months at least.

Agreement on a program for financial relief for the railroads at Washington, whereby they likely will get around $500,000,000 from the Government in the next few months on account of obligations due, is regarded as a constructive development in the trade here. Railroads not only should be enabled to buy a little more freely themselves, but repairs and purchases of equipment should stimulate, in some degree, at least, the steel and allied industries in this district.

Prices have undergone little change in recent weeks, although slack, which was at an extremely low level, is showing some signs of stiffening. It is now quoted $1.20@$1.30, compared with a low of around $1.10 recently. The recovery is due to the smaller supplies of slack occasioned by the reduction in production of prepared sizes for the Lake trade.

Anthracite and Pocahontas—Retailers have followed the wholesale market in the prices of anthracite, an increase effective this week being 25c. a ton. Egg is now quoted at $14 and stove and chestnut at $14.25. The demand for both anthracite and Pocahontas is unprecedently dull, reflecting the hope for lower prices, unemployment and reduced purchasing power of consumers.

Receipts of bituminous coal, consigned to Cleveland industries and retail dealers, for the week ended July 2, amounted to 943 cars, divided: Industrial 747 and retail 196; as compared with 933 cars the preceding week.

Lake—Although the dumpings during June averaged about 1,000,000 tons weekly, which was in excess of the May movement, all indications point to a slowing down. This is due to the congestion at the upper docks. At the height of the Lake shipments in May, operations of the No. 8 district reached nearly 70 per cent of capacity. For the last few weeks production has been around 63 per cent.

ST. LOUIS

Domestic at Standstill—No Improvement in Steam—Prices Below Cost.

There is no improvement in the local situation. Domestic buying has stopped. With thousands out of employment the dealer is beginning to realize that with cold weather the demand will come, mostly from people without ready money. That is one reason now why many dealers are not urging early buying.

Carterville is easy at buyers' prices from either shipper or dealer. The Mt. Olive price is stiff, but no tonnage. Standard has come to a dead stop.

There are no deliveries to speak of in either anthracite or smokeless, althought a little local coke is being put in. Steam is about as bad as domestic locally. In the country there is a little dealer coal moving.

Oil is replacing coal in all of the territory in southern Missouri and Arkansas. In other places central power plants are reaching out and getting away with the business.

Southwest

KANSAS CITY

Howat's Trial Closes Kansas Mines—Low Demand Still Exists—Prices Firm.

Very few of the Kansas mines worked last week on account of miners waiting for the verdict of the court in the trial of Alexander Howat, president of the Kansas District, U. M. W. of A. On Friday, July 8, the court sentenced Howat to six months in jail and a $500 fine.

While the mines have not worked since June 25, enough coal has accumulated to carry things over. Some of this coal still being held at the mines. Little or no change in the demand is apparent and operators feel they will have a hard tine to take care of the call when it starts, as everybody will want coal at once and it will be a physical impossibility to supply them. Quotations on all grades are the same as last week.

South

LOUISVILLE

Lack of Domestic Orders—Smaller Burden of Screenings—Market Quiet.

Hard driving for business is not getting much result at this time, as large consumers are not using half of their normal requirements, while refusal of domestic consumers to stock early is resulting in low orders from retailers.

Lowered production of prepared has resulted in a smaller excess of screenings. Last week some screenings were quoted at 80c., but this week the market is firm at around $1.

Quotations received show Hazard and Harlan well together on prepared coal, with Hazard quoting most of the low prices on steam.

While production is light and movement slow, it is held by a number of operators that the output as a whole this season has been surprisingly good, considering conditions in the industrial and commercial markets. Over 10,000 employees of the L. & N. R.R. at Louisville received reductions effective July 1.

BIRMINGHAM

Dull Market Conditions Prevail—Steam Prices Very Unstable—Production Further Curtailed.

Demand for commercial coal is very light and there is a surplus of steam being thrown on the market by the smaller producers who have no contracts. This has resulted in price-slashing and sharp competition for the small volume of spot business offering. Consumers are taking coal only as needed and are refraining from making contracts.

Steam prices have been materially reduced on basis of wage reductions put into effect at the mines July 1 by practically all commercial and domestic operators and a majority of the furnace companies. Quotations on mine run are about as follows: Pratt $2.40@$2.55, Big Seam $2@2.25, Carbon Hill $2@$2.50, Cahaba $3, Black Creek 2.75@$3.25, Corona $2.75.

Domestic movement on contract is not as heavy as recently, due to the fact that dealers are well stocked and are moving little coal to the consumer.

On account of the gloomy outlook in the iron trade, several furnace stacks which have been in operation have blown out during the past week, and several mines of furnace companies have been closed down. Operations are on a basis of about two days per week at commercial mines.

News From the Coal Fields

Northern Appalachian

PITTSBURGH

Steam Sales Impossible—Gas Coal Holding—Slack Weaker—Lake Tonnage Lighter.

With further decreases in mine operations there are few sellers and it is a question whether one can say there is a regular market at all. Such market as can be found is quotable higher than formerly, but this is due to absence of sellers rather than any pressure to buy. Odd lots on track have been well cleaned up. Such consumptive demand as develops is being supplied chiefly from non-union districts, where costs are much lower.

In the trade at large doubt is expressed whether the mines are operating, by a strict accounting, at the rates reported, reports having shown above 60 per cent early in May, decreasing to 42 per cent at the middle of June. There is very little contract business being carried out and Lake shipments have dropped to relatively small proportions. Pittsburgh gas coal is selling right along as consumers' requirements cannot well be filled from non-union districts.

With the competition of Connellsville and West Virginia, Pittsburgh steam coal is hardly salable at all and prices given, which are the lowest that can be done, are largely nominal.

CONNELLSVILLE

Odd Lots of Coke Cleaned Up—Market Stiffer—Coal Prices Relatively Better Than Coke—Production Very Light.

A sale of about 3,500 tons of furnace coke for immediate shipment has cleaned up one operator's visible supply. The price was $3 flat, and the coke was taken because a furnace wished to run a week longer than its contract supply would take care of. The disposition of other operators to shade $3 in an effort to create business seems to have disappeared. Brokers who a fortnight ago felt free to sell to miscellaneous consumers at $3 and then peddle the orders around to operators at prices under $3, have changed their tactics and charge $3.10 @$3.15 to the consumer.

For the best grades of byproduct coal $1.80@$2 is obtainable whenever there is any real demand, while Connellsville coal for steam purposes generally brings $1.75. With such prices ruling for coal it is considered strange that coke should sell at even as low as $3.

Foundry coke is easier by about 25c., ordinary brands being obtainable without difficulty at $4, while some choice brands are at $4.25 to the dealer and $4.50 to the consumer. We quote the spot market $3@$3.25 for furnace and $4@$4.50 for foundry.

The *Courier* reports production in the week ended July 2, at 10,430 tons by the furnace ovens, and 13,210 tons by the merchant ovens, a total of 23,640 tons, a decrease of 4,540 tons.

UNIONTOWN

Another Independent Wage Cut—Some Plant Resumption—Market Still Quiet.

Another revision downward of wages averaging about 10 per cent by the W. J. Rainey, Inc. and the Washington Coal and Coke Co. became effective last week. The new scale, which probably will be followed by other independent operators, is lower than the present scale of the H. C. Frick Coke Co., established May 6.

One independent has now closed a coal contract for 40 cars per day through the Great Lakes. In addition, 140 of its 700 ovens are making foundry coke.

Announcement of the resumption of the Isabella plants of the Hillman Coal & Coke Co. was followed by a rush of unemployed to the plants but none other than furloughed employees living there, about 600 in number, were given work.

While this plant resumption is an encouraging indication, both the coal and coke markets continue inactive, with quotations nominal. Optimistic observers are pointing to the plant resumption as an indication that the turn in readjustment has been passed while those of the more conservative type point to the dull market with predictions that the resumption cannot be sustained.

EASTERN OHIO

Production Holding — All Demands Weak and Lake Tonnage Declines—Prices Unchanged.

Despite continued sluggishness in the trade, production for the week ended July 2 kept pace pretty well with that of previous weeks, output amounting to 398,000 tons. Total production for the year to date is estimated at 8,500,000 tons or about 54 per cent of the capacity of the field for the period.

At the present rate of production the railroads are taking about 28 per cent of the total output for fuel, and about 40 per cent of capacity is being lost on account of "no market."

It is the consensus of opinion that production for Lake and the minimum requirements of railroads for fuel continue to be the mainstay in supporting mining operations, as both contract and spot inquiries from industrial consumers and the retail trade are negligible. On the one hand, it is expected that shipments of Lake cargo coal must necessarily be diminished because of lethargy in the Northwest, but there is some hope that additional support will be forthcoming from the carriers in the direction of laying aside some storage coal during the remaining summer months.

The City of Barberton has advertised for some 3,000 tons of Ohio steam coal and it is reported that the City of Painesville recently closed for 5,000 tons of mine run and ¾-in. lump at around $3@$3.25, to be delivered during the next twelve months.

There are rumors from reliable sources that a big slack deal has been consummated with a large consumer in Cleveland involving 100,000 tons spot sale for storage, delivery to be made within the next four months. Spot prices on slack have stiffened during the week by reason of smaller quantities now in the market. Other prices are steady at former levels and are shown in the Weekly Review.

FAIRMONT AND PANHANDLE

Export Cancellations Follow British Strike Settlement — Lake Tonnage Slumps—Mine Idleness Increases.

FAIRMONT

Although June production was almost equal to that of June, 1920, there was a perceptible drop early in July. Cancellation of Tidewater orders followed the settlement of the British strike and there was not so heavy a movement to the Lake, as the month opened. These two outlets practically constituted the only available spot markets, and mine idleness is increasing very rapidly.

NORTHERN PANHANDLE

As in other fields, Lake tonnage is declining and the spot market is very poor. There was no contract activity and no coal was being exported early in July, production not being over 10,000 tons daily. The only market to be found was for limited amounts of screened coal.

UPPER POTOMAC

More Mines Closed—Sales Possible Only on Best Coals.

Production was at a very low ebb during the week ended July 2. No mines found it possible to operate along the upper reaches of the Potomac and but few in the Georges Creek field were running. There was scarcely any call except for the highest grades of coal, and few buyers were to be found even for these.

CENTRAL PENNSYLVANIA

June Production Exceeds May—Business Going to Lower Wage, Non-Union Mines.

Production figures for June show a slight increase over May, being 55,964 cars for June as compared with 55,255 cars in May. According to reports,

business is going largely to the mines where adjustments have been made to the 1917 wage scale. Under normal conditions, the non-union mines produce about 25 per cent of the coal in the district but during June 50 per cent was from the non-union mines.

Business is very dull in the unionized districts and the operators contend that they are unable to go on producing when they cannot compete with those using the 1917 scale.

Middle Western

WESTERN KENTUCKY

Contract Business Appears—Prices Well Maintained—Feeling Is Rather Optimistic.

Operators report that while business is scattered over a large territory, there have been some fair steam contracts closed, and shipment of prepared sizes has been better. Movement of domestic sizes South is somewhat heavier than it has been, while shipments to Louisville, Nashville, Memphis and other Southern markets have held up surprisingly well, and there is a fair tonnage moving into Indiana and Illinois.

Operations continue at around two days a week, although some of the larger operators with several mines, are operating a part of their chain full time, with the other mines laid up for the time being.

INDIANA

Steam and Domestic Markets Lag—Price Concessions Fail to Stimulate Buying.

At the present time there is a general stagnation in both the steam and domestic markets. Hints that there is likely to be a coal shortage are denied by many coal men, though the public is being urged to buy its coal early. Some coal is being sold, but the volume is way below normal. Because of the chaotic condition of the market, it is nearly impossible to quote prices. Coal is being sold for just about what it will bring.

Few contracts are being made. Gas companies continue to pile up coke with no market. After some reductions until the price was brought around $9 a ton, the companies have shown no further inclination to reduce prices. However, there is no demand at any price.

Because of the dull demand, jobbers are doing virtually nothing. Retailers report some trade, but it is of a desultory nature and cannot be called indicative of a normal demand.

SOUTHERN ILLINOIS

Business Continues to Slow Up—Steam and Domestic Both Sluggish—Better Prospects Ahead.

Over the Fourth there was a lighter Carterville movement than at any time this season. The public still has it that coal will come down, that the miners will take a cut, and rates topple. The steam situation is worst. Screenings are at a standstill. It is understood that the larger operators pooled an order for several thousand tons for a large industrial or public utility plant and that the price was $1.25@$1.35. This is the price today although the circular hangs out at near $3.

There promises to be within 45 to 60 days a scarcity of equipment in the Middle West. Right now the carriers are up against the greatest shortage of cars in history in the Kansas wheat belt. It will be almost a parallel when coal begins to move.

Very little coal is selling at circular prices. It is reported that the "Big Six" are holding pretty well in line, but the little fellows are dropping along the way and meeting the Independents' prices of from $3 up for domestic, $1.25 for screenings and $2.75 for mine run, with No. 1 and No. 2 nut as low as $2.35.

In the Duquoin field, it is with one exception, a case of independent prices. Two days a week and a hard time at that, with little, if any, railroad tonnage moving tells the tale. Mt. Olive field continues unruffled with its two days average per week and more than half its mines idle. Some railroad coal is moving and the bulk of steam and domestic is going North and West on contract.

The Standard field shows no improvement. One mine resumed, or tried to, and a couple more went idle last week. It is hard to move anything. But very little domestic is moving to St. Louis. Considerable dissatisfaction exists among miners and railroad tonnage continues light.

Middle Appalachian

HIGH-VOLATILE FIELDS

Lake and Tide Movement Declines—Spot Buying at Standstill — Prices Very Soft.

KANAWHA

Production declined slowly through the week ended July 2 as there were no new contracts being made to replace those which expired on July 1. No coal could be disposed of at Tide and the Lake movement was slowing further. In many instances, production was being maintained more to keep organizations together and to absorb overhead than anything else.

LOGAN AND THACKER

Not less than 50,000 tons daily was being mined in the Logan region. However, this was limited to comparatively few companies, those with dock facilities up the Lakes and on the Ohio. Buying was largely at a standstill and prices as a result were very soft.

Williamson mines continued to produce at the rate of about 60 per cent of capacity. A very large proportion of the coal was moving on contract, general markets being unimproved.

NORTHEASTERN KENTUCKY

Less coal was produced during the opening days of July, with few mines operating two days a week. Lake shipments were further curtailed and both steam and prepared were in the doldrums.

VIRGINIA

Despite heavy losses because of "no market," mines were producing at mainly going on contract. Prices were about on a par with those in the Pocahontas field.

LOW-VOLATILE FIELDS

Tidewater Demand Holds—All Other Markets Inactive — Production Still Low.

NEW RIVER AND THE GULF

A better Tidewater demand during the week ended July 2 stimulated New River production to some extent. However, all other markets were rather inactive. The tonnage going to Lakes was not heavy and there was little spot buying and even less contracting.

During the latter part of June the Virginian suffered some severe freight wrecks which made it hard to furnish empties to those few mines which actually needed equipment. With a better Tidewater demand production reached about 60 per cent of capacity although there was no general improvement in market conditions or in prices.

POCAHONTAS AND TUG RIVER

Pocahontas production declined slightly during the week. Very little spot coal was moved and only contract business enabled production to hold up to the 300,000-ton mark. Prepared sizes held their own but slack coal weakened to $2@$2.50.

Conditions in Tug River were similar to those in the Pocahontas regions. There was a slight production curtailment because of the slowly dwindling demand, yet so much of the output was under contract, that 100,000 tons represented the week's output, much of the coal going to Tide.

West

UTAH

Market Unchanged — Active Demand Inevitable—R.Rs. Prepare for Rush.

It is felt that the buyers' strike cannot last much longer and railroads are getting ready to take care of the rush of business that is expected during the next few months. One of the two mines belonging to the Utah Fuel Co. at Sunnyside in Carbon County is now running full time. Comparatively few of the miners have left as a result of the shortage of work and when operations are resumed on the big scale which is expected shortly there will be plenty of men willing to work.

MINE And COMPANY NEWS

COLORADO

The Moffat Coal Co., of Denver has contracted with Roberts and Schaefer Co., Chicago, for the installation of the tipple equipment for the new mine at Oak Hill. This tipple will be of fireproof construction throughout and one of the most modern in the Colorado field.

ILLINOIS

The Peabody Mine, one of the largest in the United States, which has been closed for several months, opened recently and it is the plan to work it to capacity during the next few months to prepare for the winter orders already on hand and those anticipated. With the Peabody mine running, all of the mines in the Springfield territory are in operation. Some are laying off for a day or two from week to week, but the flow of coal to the railroads is well maintained. The mine is on the Chicago & Alton and a large tonnage is being applied to that road.

The Sangamon Coal Co., Springfield, has received a set of Nolan automatic cagers for the bottom, and a set of Nolan block stops for their cages.

INDIANA

The Consolidated Indiana Coal Co., incorporated under the laws of Maine, has filed notice of a decrease in capital stock to $100,000.

A report from Oakland City states that the George A. Enos interests of Cleveland, have bought the coal mines and properties of the **C. R. Cummings Co.** and plan installation of two miles of track, and improvements costing close to a million dollars.

What is expected to be the most modern free washhouse at any coal mine in the country is under construction at the **Oliphant-Johnson Mine** near Bruceville. The building, which is being equipped at a cost of more than $20,000, was designed by J. A. Schellenger, mine superintendent and W. E. Buss, mine engineer. It will be fireproof, of reinforced concrete, 117 x 60 feet, in dimensions and one story in height. Shower baths will be operated with an automatic release, water to be supplied from the mine lake. The building will accommodate 600 men at one time.

The Indiana Creek Coal Co., has bought 2,000 acres of coal land five miles from Petersburg, and will start sinking a new shaft for a railroad mine early this fall.

The Gould Coal Washing and Mining Co., at Sullivan, has filed a final decree of dissolution with the secretary of state. **The Coalmont Coal Co.**, also of Sullivan, has filed a preliminary notice that the corporation will be dissolved.

KENTUCKY

River movement slumped a little in May, as compared with last year, and was far below April of this year. Retailers stocked river coal in April, but movement was slow and there has not been much buying since. Records of the year as compared with last year on River coal shows, in net tons:

	1921	1920
January....	1,400	3,022
February...	970	7,800
March.....	1,035	4,040
April.....	14,533	7,520
May.....	5,168	7,374
Total. ..	23,106	29,756

Milwaukeeans have purchased four additional coal mines in the Kentucky fields, making six in all, owned by the **Standard Harlan Coal Co.**, which has just been organized with $550,000 capital stock. The bulk of the coal mined will be marketed in the south, one of the officers being a prominent coal dealer in Atlanta.

The St. Bernard Mining Co., Earlington, has received a set of Nolan automatic cagers.

The F. B. S. Coal Co., of Island, recently organized with a capital of $250,000, is perfecting plans for the development of extensive coal properties. The company has a tract of about 1,500 acres of land, and will install considerable equipment. W. C. Mortenson is general manager.

Government engineers recently created an artificial wave in the upper Ohio River by manipulation of the lock and dam system, to enable 50,000 tons of coal to come south toward Cincinnati and Louisville. There were nine towboats and between 100 and 125 barges and coal boats waiting for a boating stage.

NEW YORK

The Pattison & Bowns Division of William Farrell & Son, Inc., formed a few years ago by the consolidation of several retail coal yards in Manhattan and the Bronx and the wholesale firm of Pattison & Bowns, has been sold to a new corporation to be known as **Pattison & Bowns, Inc.** Gardiner Pattison, who was head of the former firm of Pattison & Bowns, is to be president of the new concern which will be located in the Cunard Building, New York City. The announcement of the separation is contained in a statement issued jointly by Thomas F. Farrell, president of William Farrell & Son, Inc., and George F. Getz, president of the United States Distributing Corporation, with which Mr. Pattison is also connected. The new corporation has been organized for the purpose of carrying on a wholesale coal sales business. This step has been taken to definitely segregate the wholesale business from the retail and will permit William Farrell & Son, Inc., to give its entire attention to retail operations. The officers will be: Gardiner Pattison, president; L. J. Hunter, vice-president and treasurer; Clarence P. Morrell and Preston Davie, vice-presidents; W. L. Whittlesey, secretary and J. R. Edwards, assistant treasurer. The Board of Directors will include the following: Geo. F. Getz, president of the United States Distributing Corporation and of the Globe Coal Co., Chicago; Harvey D. Gibson, president of The New York Trust Co.; Francis S. Peabody, chairman of the board of Peabody Coal Co.; Acosta Nichol of Spencer Trask & Co., Moritz Rosenthal of Ladenburg Thalmann & Co., John T. Sproull, president, Coal & Iron National Bank; Mervin W. Bricker of the Coal & Iron National Bank; Hon. Alfred E. Smith, chairman of the board of the United States Trucking Corporation; Gardner Pattison, Louis J. Hunter, Preston Davie and C. P. Morrell.

OHIO

The Middle States Coal Co., chartered several weeks ago with a capital of $50,000 has taken over two large operating mines at Jacksonville in Athens County, formerly controlled by the **Northern and Southern Coal Co.** The combined output of the mines is about 2,000 tons daily. The product will be sold through the Central West Coal & Lumber Co., of Columbus of which concern the Middle States Coal Co. is a subsidiary. A. R. Jones is president and R. B. Hurst, secretary and treasurer of the company.

PENNSYLVANIA

Mine Inspectors in fifty-five districts of the bituminous and anthracite fields of Pennsylvania were apointed by Governor Sproul recently. The anthracite region inspectors serve four years in the districts, according to the order named, as follows: Benj. Maxey, Forest City; P. J. Moore, Carbondale; L. M. Evans, Scranton; Jenkin T. Reese, Scranton; S. J. Phillips, Scranton; David T. Williams, Scranton; Augustus McDade, Taylor; Robert Johnson, Pittston; Edwin C. Curtis, West Pittston; John B. Corgan, Kingston; Thomas J. Williams, Kingston; D. T. Davis, Wilkes-Barre; Frank Kettle, Nanticoke; Joseph J. Walsh, Wilkes-Barre; David J. Roderick, Hazleton; J. J. Stickler, Hazleton; Isaac M. Davies, Lansford; Evan G. Evans, Coaldale; Michael J. Brennan, Pottsville; P. C. Fenton, Mahanoy City; Archibald B. Lamb, Shenandoah; William Reid, Centralia; Benjamin I. Evans, Mt. Carmel; P. J. Frier, Shamokin; Charles J. Price, Lykens. Inspectors who serve from May 15, in the bituminous districts are as follows: District 5, Richard Maize, Uniontown; District 9, Silas S. Hall, Connellsville, Fayette; District 11, John J. McDonald, Greensburg; District 12, T. J. Lewis, Punxsutawney; District 13, John Ira Thomas, Johnstown; District 19, James J. Stoker, Irwin; Districts 27, 28, 29 and 30, Harry Phythyon, Belle Vernon; Thomas H. Thompson, Kittanning; Patrick S. King, Pittsburg, and Charles H. Crocker, Johnstown.

The Philadelphia and Reading Coal and Iron Co. is taking the lead in opening new coal developments near Pottsville and is preparing in several places to mine coal above the water level. At the **Rausch Creek Colliery** new openings are being made whereby coal may be mined for fifteen years above water level and 100 years below water level. At Middle Creek extensive developments are in progress, and soon there will be seven drifts supplying coal above water level.

WEST VIRGINIA

The Pittsburgh Coal Washer Co. has secured a contract from the **Borderland Coal Co.** for improvements to their No. 1 plant at Borderland, consisting of a modern steel tipple with a conveyor about 800 ft. long. The coal will be brought from Kentucky across the Tug River to West Virginia side.

Recently, the Pittsburgh Coal Washer Co. closed a contract with the **Booth-Bowen Coal & Coke Co.** at Bramwell, for a large modern steel tipple. When completed, this tipple will be one of the most modern in the Pocahontas Field.

The Puritan Coal Corporation has awarded a contract for the erection of 100 miners' homes. This company has a big lease near Burch.

Much damage was done by a mine fire at the Phoenix mine of the **Alpha-Portland Cement Co.** near Clarksburg recently. A trap door was ignited by a short-circuit, the flames finally becoming communicated to the coal.

Fire believed to be of incendiary origin destroyed the head-house of the **Fort Pitt Coal Co.** at Wilsonburg. Not only was the structure burned to the ground but the machinery was badly disabled.

It is learned in connection with the organization of the **William Dempster Coal Co.**, only recently organized, that a lease of 250 acres on Blue Creek in the Kanawha district will be developed. Plans are being matured to drive entries for the purpose of mining coal in the No. 5 block seam. What is known as the Shrader Mine was included in the purchase. Offices will be established in Charleston, with Duncan Reid of Bay City, Mich., having personal supervision of development work. The company is headed by William Dempster, of Bay City.

Four West Virginia coal companies discontinued business about the middle of June and terminated their corporate existence. They were the **Lyons Coal Co.**, of Fairmont, of which A. J. McDaniel was president; **Auto Coal Co.**, of Wheeling, of which Nick Valentine was president; **Lick Branch Coa Co.**, of Charleston, of which J. D. Wygal was president; **Wheeling's Center Coal Co.** of Uniontown, Pa., of which John T. Robinson of Uniontown, was president. Two companies increased their capital stock about the same time. They were: **Gilbert-Davis Coal Co.**, of Morgantown, of which Ernest H. Gilbert is president, from $500,000 to $1,500,000; **Northland Coal Co.**, of Columbus, of which T. J. Hoffman is president, from $25,000 to $300,000.

Traffic News

The Morton Salt Co., of Chicago, has complained against unreasonable rates on coal from West Virginia mines to Lake ports for trans-shipment by vessel beyond. It asks for a readjustment of rates to all Lake ports in order that Ludington and Port Huron, Mich., shall be protected in the application of the net rates to the ports.

An examiner recommends that rates on smithing coal from Douglas, W. Va., to Iowa, Nebraska and Wisconsin and on coke from Jamison, Pa., to Iowa and Wyoming were not unreasonable.

An examiner recommends that rates during Federal control on intrastate shipments of bituminous coal from mines in the Clinton district and from Ehrmandale, Ind., to Mt. Silica, Ind., were unreasonable.

Complaint has been filed, as of Feb. 26, with the I. C. C., by the **Delaware, Lackawanna & Western R.R. Co.** against Director General Payne, as agent, Docket No. 12854. It is directed against unjust and unreasonable rates on anthracite from Avondale mine to Woodward breaker, a distance of 4.4 miles, during Federal control. The rate challenged was 60c. and exacted from the railroad company as shipper. Reparation is asked.

In a complaint to the I. C. C. the **Seneca Iron & Steel Co.,** and others of Buffalo, allege as unreasonable the rates on coal from the Connellsville, Pa., district to Buffalo and other destinations in New York, because they exceed the rates from the Pittsburgh district.

The Commerce Club of St. Joseph, Mo., complains against unreasonable rates on coal from points in Illinois to St. Joseph.

John A. Merritt & Co., of Pensacola, Fla., alleges unreasonable rates on coal from Acmar, Fla., to Pensacola when compared with rates from Acmar to Mobile and New Orleans; and also complains of discriminatory wharfage and handling charges of 40c. a ton.

The Detroit Coal Exchange alleges unreasonable rates on hard coal from originating points in Pennsylvania to Detroit and Wyandotte, Mich.

Cincinnati shippers intend to continue their fight against the new L. & N. coal rates, from eastern Kentucky fields to Cincinnati despite the fact that the I. C. C. has refused to suspend the new rates. On coal from the mine fields touched by the L. & N. the new rates will mean an increase of 25c. a ton to the Cincinnati consumer.

Personals

Carl A. Wendell, of New York, has been appointed consulting engineer of the Bureau of Mines in matters relating to coal washing and coal preparation. Mr. Wendell will visit several Eastern stations of the bureau, and subsequently will advise with bureau officials as to a program for further development work in investigation and improvement of coal preparation methods.

Arthur Appleyard, superintendent of the mines of the Logan Coal Co. and president of the People's Bank at Beaverdale, Cambria County, Pa., has gone to Mt. Clemens, Mich., where he will remain a month in the hope of benefitting his health, which has not been good for some time.

Paul T. Bearer, comptroller of Cosgrove & Co., Johnstown, Pa., has been elected a director of the Columbia National Fire Insurance Co., whose home office is located in Lansing, Mich. Mr. Bearer succeeds the late **Judge Francis J. O'Connor** of Cambria County.

A. S. Learoyd, assistant to the president, and **E. M. Reynolds,** comptroller, have been elected vice presidents of the Lehigh Coal & Navigation Co.

Percy E. Barbour, assistant secretary of the American Institute of Mining and Metallurgical Engineers, is temporarily incapacitated for duty by sickness.

R. C. Hoard, secretary of the Hazard Coal Operators' Association, is now a married man. He has returned to headquarters in Lexington after spending a honeymoon at Niagara Falls.

T. B. Bryan, general manager of the Elkhorn Steam Collieries Co. at Bramwell, W. Va., spent several days in Cincinnati, going over the trade situation.

J. B. Yates, of Eleanora Mines, Pa., with the Rochester & Pittsburgh Coal & Iron Co., has resigned to accept a position as general superintendent with the Lumsted Mining Co., at Echo, Pa.

A. H. Bannister, mining engineer of Pittsburgh, has been appointed manager of the Northern West Virginia District by the Mancha Storage Battery Locomotive Co.

Arthur McCune has been appointed general superintendent of the Henderson Coal Co. at Canonsburg, Pa.

Paul Weir has recently been appointed chief engineer for the Bell & Zoller Mining Co. at Ziegler, Ill.

Carl Scholz, vice-president and general manager of the Raleigh-Wyoming Coal Co., with headquarters at Charleston, W. Va., was a recent visitor at Parkersburg.

Kuper Hood, sales manager for the Houston Coal Co., has left Cincinnati for a trip abroad. Mrs. Hood accompanied him.

Patterson Schoff, of the Johnstown office of W. A. Marshall & Co., visited the New York office of Marshall & Co. recently.

Howard W. Showalter, of the Diamond Coal Co., accompanied by his wife, has gone to the Trough Club in Hampshire County, W. Va. In the same party was **E. A. Russell** of the Fairmont & Cleveland Coal Co.

A. W. Patton, of the Patton Coal Co. of Fairmont was in Parkersburg for a few days in June visiting his mother.

A party of officials of the Jamison Coal & Coke Co. from Greensburg, Pa., inspected the properties of the company in the Fairmont region about the middle of June. Members of the party included **George B. Taylor,** general manager; **R. E. Jamison,** assistant sales manager; **J. C. Jamison,** general superintendent; **C. E. Cowan,** chief engineer.

Association Activities

Morgantown Coal Club

Members of the coal club at their last meeting held in Morgantown signified their intention of becoming members of the Morgantown Chamber of Commerce and of taking an active part in that organization, such action being taken as the result of any appeal made by Mr. Lyons of the Fuel Corporation of America, who had been asked by the Chamber of Commerce to enlist the cooperation of all coal men in building up the Chamber of Commerce.

A report on what had happened at the meeting of the American Wholesale Coal Association at Washington and what the association was doing to protect the industry from harmful legislation was made by M. L. Taylor of the Morgantown Coal Co., who had been elected a director of the national organization. Mr. Taylor laid stress on the fact that whatever affected the industry also affected other lines of business linked with the industry and he appealed for the cooperation of business men in resisting legislation which sought to single out the coal industry for government regulation.

Upper Potomac Coal Association

An effort is being made by the Coal Association to secure the opening of a road along the Potomac River from Bloomington, Garrett County, Md., to Thomas, W. Va., and with that object in view members held a conference with the county commissioners of Garrett County. If such a road were to be constructed it would prove to be a great developer, it is said. Inasmuch as it would be necessary, in building such a road to bridge the Potomac at several points and enter West Virginia, it is also hoped to enlist the aid of the county authorities in West Virginia. Prior to the meeting with the Garrett County commissioners, directors of the association held a conference at Cumberland with the representatives of the association.

Northeast Kentucky Coal Operators' Association

A meeting of the board of directors of the association was held at Ashland recently, routine business occupying much of the attention of the directors, although a number of executive matters were also taken up for consideration by them. President Cadwalader Jones of Betsey Lane, Ky., presided at the meeting.

Alabama Coal Operators' Association

Frank H. Crockard, president of the Woodward Iron Co., has been elected president of the Alabama Coal Operators' Association for the ensuing term, and Frank Nelson, president of the Bryan Coal Corporation and owner and operator of other coal properties, will serve as vice president. The activities of the association are restricted to matters of efficiency and improvement of facilities for mining coal, safety and first-aid work, and it takes no official cognizance of wage matters or selling prices, this being left to be dealt with by the members as individuals.

Industrial News

Buffalo, N. Y.—The Lake City Coal Co., of Cleveland has opened a branch office here, with J. H. Stacy from the home city as agent. Offices are located in the Prudential Building.

Pittsburgh, Pa.—A. F. Strouse, formerly electrical engineer and mine superintendent with the H. C. Frick Coke Co., afterwards in the Government service, has recently opened a consulting office at 1603 Commonwealth Bldg.

Washington, D. C. — The United States Civil Service Commission will hold an open competitive examination on Aug. 3, for coal inspector and sampler, to fill vacancies in the Bureau of Mines, Department of the Interior, for duty in Washington, D. C., or elsewhere, at entrance salaries ranging from $1,200 to $1,800 per year and vacancies in position requiring similar qualifications may be filled from this examination. Applicants should apply at once for Form 1312, to the Civil Service Commission, Washington, D. C., or to the Secretary of the United States Civil Service in principal cities.

Obituary

Benjamin Nicoll, head of the firm of B. Nicoll, & Co., New York City, died suddenly after his return from the Dempsey-Carpentier fight. The death, presumably due to apoplexy, was entirely unexpected.

John Barnes, Jr., prominent coal operator of Philipsburg, Centre County, Pa., died recently. He was 42 years of age and was a member of the firm of Atherton & Barnes, coal operators, and treasurer of the Williams Grove Brick Co. of Bigler. His father and uncle were prominent pioneer coal operators in central Pennsylvania.

Caleb E. Long, of Philipsburg, Pa., and an extensive coal operator and prospector, died recently, death being caused by paralysis with which he was stricken a short time before. He was born in England and came to America when a child and settled in Philipsburg.

Denis Mortfield, a member of the commission appointed by Governor Frank O. Lowden of Illinois, to investigate mining conditions, died recently at a DuQuoin hospital. He was well known in mining circles.

Coming Meetings

The Huntington Coal and Industrial Exposition will be held in the Chamber of Commerce Building, Huntington, W. Va., Sept. 19 to 24 incl. Chairman of committee, Thomas A. Palmer, Huntington Chamber of Commerce, Huntington.

American Institute of Mining and Metallurgical Engineers will meet at Wilkes-Barre, Pa., Sept. 12 to 17. Secretary Bradley Stoughton, 29 West 39th St., New York City.

National Association of Cost Accountants will hold its annual convention at Cleveland, Ohio, Sept. 14, 15 and 16. Secretary, S. C. McLeod, 130 West 42d St., New York.

The American Mining Congress and National Exposition of Mines and Mining Equipment. The twenty-fourth annual convention on Oct. 17 to 22 at the Coliseum, Chicago, Ill. Assistant secretary, John T. Burns, Congress Hotel, Chicago, Ill.

The West Virginia-Kentucky Association of Mine, Mechanical, and Electrical Engineers will hold its annual meeting at Huntington, W. Va., on Sept. 20 to 23. Secretary-treasurer, Herbert Smith, Huntington, W. Va.

The following first-aid meets will be held during August: The Davis Coal & Coke Co., first-aid and mine rescue meet at Thomas, W. Va., on the 3rd. The State of Iowa will hold its annual first-aid and mine-rescue meet on the 6th at Albia. At Birmingham, Ala., state first-aid and mine-rescue meet on the 6th. On the 20th a state first-aid and mine-rescue meet will be held at Charleston, W. Va. Under the auspices of the Colorado Fuel & Iron Co. a local first-aid and mine-rescue meet will be held at Pueblo, Col., on the 20th.